

REPORT OF THE SWIFT FOX CONSERVATION TEAM

1995



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INTRODUCTION

The distribution of the swift fox (*Vulpes velox*) is currently widespread occurring in nine states and two Canadian provinces. Locally abundant populations are known to occur in Colorado, Kansas and Wyoming, and the swift fox may be common in parts of Texas, New Mexico and Oklahoma. The current distribution, however, appears more limited compared to the presumed pre-settlement distribution, and the status of the swift fox population in some areas is undocumented. As a result, a petition was submitted to the U.S. Fish and Wildlife Service (USFWS) to list the swift fox as an endangered species.

The state wildlife management agencies from the affected states and several federal resource management agencies formed the Swift Fox Conservation Team (SFCT) in December, 1994 to develop management objectives for the species as a constructive alternative to listing the species as endangered. The SFCT originally consisted of representatives of state wildlife management agencies from each of the 10 states within the historic swift fox range, representatives of the U.S. Forest Service, and representatives from Northern Colorado University and Colorado State University. A Habitat Conservation Assessment and Strategy for swift fox (HCAS) was drafted with the generalized objective to identify and reduce threats to the continued existence of the swift fox in the United States. Since then, the USFWS, the USDA APHIS-Animal Damage Control (APHIS-ADC), the National Biological Service (NBS), and the Canadian Wildlife Service (CWS) have been added to the SFCT. The HCAS is equivalent to a recovery plan for a threatened or endangered species, but is being initiated by the SFCT as a pro-active alternative with fewer administrative complications and potentially greater cooperation compared to listing the swift fox as a federal endangered species.

As a result, the USFWS classified the petition to list swift fox an endangered species as warranted but precluded in June, 1995. The HCAS will provide the best means available to develop positive management decisions for the species to ensure that swift fox management is scientifically sound and has the best potential for success on private lands. This document was produced by a cross section of the best furbearer specialists in the Great Plains, and it contains the best state-of-the-art data and technology available for furbearer research and management. The objective of this annual report is to present the individual reports of the states and other management agencies of their management and research activities in 1995 in accordance with the HCAS. The HCAS is a working document that will periodically be revised to reflect new information on swift fox genetics, distribution and limiting factors.

APPROACH

Specific objectives for the HCAS were developed in December 1994 by the SFCT and presently consist of the following: 1) to enhance the distribution of swift fox where ecologically and economically feasible, 2) to maintain genetic diversity and health within the species, 3) to maintain current areas of abundance and manage additional populations for increased abundance, 4) to elevate the management status of the species throughout the distribution, and 5) to develop incentives for private landowners to manage for swift fox. The success of the HCAS depends on the combined and coordinated efforts of all state wildlife management agencies, federal land management agencies, many research institutions and private landowners. Initial efforts in accomplishing objectives and testing hypotheses will be to evaluate various techniques for monitoring distribution of swift fox throughout the Great Plains. A great deal of divergence of opinion exists regarding adequate techniques and the relationship of results to actual population densities. Ultimately, swift fox biology will be sufficiently investigated so that the measurement of population sizes and densities can be accomplished. Efforts

will also be made to increase the base of knowledge of other aspects of swift fox ecology. For example, studies are contemplated to evaluate swift fox social and territorial behavior, reproductive performance, habitat preferences and requirements, survival rates, population modeling and interspecific competition between swift fox and the other canid species that currently exist in the Great Plains.

RESULTS

Reports from each of the state wildlife management agencies and the federal resource management agencies are presented beginning with the southern plains states and ending with the northern states. This was done to allow the reader to visualize a continuum of swift fox research and management activities for 1995 beginning with the southern portions of the historic range and proceeding to the northern portions of the historic range.

SWIFT FOX INVESTIGATIONS IN TEXAS, 1995

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ABSTRACT

The goal for 1995 was to establish and initiate a strategy to protect rare species, including the swift fox, that inhabit the short grass prairies of the Texas panhandle. An proposal entitled "Conservation Strategy for the Texas Panhandle Short Grass Prairies - A Multi-Species Approach" was submitted to the US Fish and Wildlife Service for funding under Section 6 of the Endangered Species Act. The two-year proposal was accepted and Kevin Mote was selected in July to perform the duties outlined in the proposal. As the endangered species regional biologist, Kevin has met with several landowners and their representative groups, as well as University, Natural Resource Conservation Service (NRCS) and APHIS-Animal Damage Control biologists to begin addressing swift fox surveys and conservation strategies. Kevin was trained in October by swift fox biologists in Kansas in trapping, tracking, and spotlighting techniques and has conducted initial swift fox tracking surveys to determine the feasibility of a survey in the Texas panhandle. Location of swift fox museum specimens have been mapped to help establish survey transects. The survey is expected to begin in early 1996. In addition to Kevin's field work, a biologist from West Texas A&M University has surveyed property owned by the U.S. Department of Energy near Amarillo for signs of swift fox (tracks, dens) and she has determined that swift fox are present.

INTRODUCTION

Historically, the range of the swift fox extended from the Texas panhandle south to central Texas and west to the Trans-Pecos region. In a report (Jones et al. 1987) submitted to the Texas Parks and Wildlife Department's (TPWD) Furbearer Program, the authors predicted that the range had likely been reduced to the counties in the northwestern part of the panhandle. This prediction was based on landuse patterns and museum specimens, but no field surveys were conducted to verify their distribution.

Swift fox are considered furbearers by TPWD (see regulations in Attachment A). Because Jones et al. (1987) estimated 20,000 swift fox remaining in the panhandle based on predictive models, and because the number of swift fox collected by trappers over the previous 10 years was negligible, TPWD did not recommend a change in the classification or regulations of swift fox. Although we do not have an up-to-date population estimate of swift fox, the number of swift fox taken by trappers is still negligible.

TPWD is approaching the needs of the swift fox and the other short-grass prairie species by working with private landowners and other agency biologists to develop a voluntary, non-regulatory conservation strategy. Toward this end, TPWD developed the proposal "Conservation Strategy for the Texas Panhandle Short Grass Prairies - A Multi-Species Approach". The objectives of this proposal include 1) cooperating with private landowners and other agency biologists to develop at least one strategy for conserving the panhandle short grass prairie ecosystem, 2) developing management strategies that may further enhance or maintain populations of species of concern, 3) providing public outreach, 4) identifying and quantifying available short grass prairie habitat, and 5) determining the status of swift fox, mountain plover, plains spotted skunk, burrowing owl, and other species of concern when possible.

METHODS

The primary goal for 1995 was to initiate the Texas panhandle rare species conservation strategy. This included proposal funding and the placement of a regional biologist in the Texas panhandle. Once this goal was secured, the regional biologist was to establish rapport with landowners and the local community and to begin the assessment of the status of swift fox and other potentially rare species.

Another goal for 1995 was to review museum specimen records for historic locations of swift fox, to enter the data into a database, and to map the locations on topographic and county maps. Such data will hopefully provide us with information on the most recent locations of core populations which we can then use to identify future survey lines. We requested specimen records from 40 museums throughout the United States. Data requested included specimen location, year, collector, and other biological data such as age and sex.

In addition to TPWD efforts, Dr. Kathleen Blair from West Texas A&M University has been working with the Pantex Plant, a nuclear weapons facility owned by the US Department of Energy, to assess the presence and status of the swift fox on their land. Her 1995 field work included a visual survey of the property to search for swift fox sign such as den sites and tracks. Her report is provided as Attachment B.

RESULTS

The USFWS Section 6 proposal was accepted and the regional biologist, Kevin Mote, began the tasks outlined in the proposal in July 1995. Therefore, efforts toward determining the status of the swift fox and developing a conservation strategy for the panhandle are just beginning. Despite the short time period, accomplishments include 1) initial meetings with trappers, landowner/agricultural groups, university biologists, and other agency biologists such as NRCS and APHIS-ADC, 2) training in swift fox survey techniques by qualified biologists from Kansas, 3) initial surveys of suitable habitat using local Agricultural Extension maps, and 4) initial establishment of swift fox survey tracking and spotlighting transects.

A preliminary map of counties where swift fox museum specimens have been collected is included as Attachment C. Forty-eight specimens were collected from 22 counties. The last recorded specimens were collected in 1986 at two localities in Dallam County in the northwest part of the Texas panhandle. The 7 specimens collected in the 1970s were from the central to northwestern part of the panhandle. Although the data has been entered into the Natural Heritage Biological Conservation Database and mapped on topographical maps, it has not been Quality Assured, so is therefore not verified for date entry accuracy. Finalization of the historical specimen record is scheduled to occur in 1996.

On the Pantex Plant in Carson County, Dr. Kathleen Blair reported collecting 7 sets of swift fox tracks and recorded the locations of 174 swift fox dens. Swift fox scat and tracks were found near 2 of these den sites. Pantex is planning a more thorough survey to verify the preliminary data in 1996 that would include trapping and radio telemetry.

In 1995, the two TPWD staff members assigned to swift fox recovery (Peggy Horner and Kevin Mote) have spent a combined total of 500 staff hours and \$10,000 to initiate the conservation strategy. Funding was provided by TPWD and a USFWS Section 6 grant.

DISCUSSION

1995 was designed as a year for foundation-building. Toward that end, we have accomplished many of our objectives. We have selected a regional biologist who will work with local landowners and biologists to begin developing criteria for a conservation strategy for several of the rare Texas High Plains species, including the swift fox. Communication with local people has begun. It has been determined that swift fox are present in Carson County on the Pantex property, and we have established tracking and spotlighting transects for surveys to be conducted in 1996. Under the Swift Fox Conservation Strategy, these accomplishments begin to address Objective 2 (Determine current species distribution of the swift fox), Objective 5 (Promote habitat conservation and protection measures in occupied and suitable swift fox habitat), Objective 6 (Promote public awareness of swift fox to achieve program support), and Objective 9 (Integrate swift fox management objectives with the habitat objectives of other short-grass prairie ecosystem species).

The primary goal for 1996 is to conduct field surveys for the presence of swift fox throughout its historic range. Part of the survey will be funded by money provided to the Swift Fox Conservation Team by the USFWS (\$5000). This money will be used to hire a field technician to survey half the transects which will supplement those transects surveyed by Kevin Mote. Kevin's funding will be provided by TPWD and USFWS Section 6 funding (estimated \$10,000)

LITERATURE CITED

- Jones, J. K., Jr., C. Jones, R.R. Hollander, and R.W. Manning. 1987. The Swift Fox in Texas. Unpubl. report submitted to Texas Parks and Wildlife Department, Austin, Texas.
- Blair, K. 1995. Swift Fox survey at Pantex Site, Carson County Texas. Unpubl. report submitted to Pantex, Department of Energy, Amarillo, Texas.

Attachment A. Texas Parks and Wildlife Department Furbearer Regulations

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STATEWIDE FUR-BEARING ANIMAL AND TRAPPING PROCLAMATION

1. Introduction.

The Texas Parks and Wildlife Commission in a regularly scheduled public hearing held August 26, 1993 adopted new rules at §§65.374 and 65.383 with amendments to 31 TAC §§65.372, 65.373, 65.376, 65.378, 65.380, 65.381, 65.382, 65.383 and 65.389 concerning the taking, possession, propagation, transportation, exportation, importation, sale and offering for sale of fur-bearing animals or their parts under the authority of Chapter 71, Parks and Wildlife code with no changes to the proposed text as published in the July 23, 1993 issue of the Texas Register.

Information gathered has shown that the uncontrolled importation and release of fur-bearing animals taken from the wild poses a potential health threat through the introduction of new strains of rabies and or parasites to native fur-bearing animals, pets and humans.

2. Justification for the Rules.

The rules are needed to provide the Texas Parks and Wildlife Commission with the authority to adopt regulations for the taking, possession, propagation, transportation, exportation, importation, sale, and offering for sale of fur-bearing animals, pelts, and carcasses as the commission considers necessary to manage fur-bearing animals or to protect human health or property.

3. How the Rules Will Function.

These rules redefine the term "resident" to conform with statutory language; authorize increased fees for trappers, retail furbuyers, wholesale fur dealers and fur-bearing animal propagators; provide that a person possessing a hunting license may take fur-bearing animals if the taking is not for sale, barter or exchange and the take does not exceed the daily bag limit or possession limit; prohibit import of live fur-bearing animals taken from the wild, authorize the import of offspring of fur-bearing animals derived from captive reared stock and prohibit the commingling of fur-bearing animals held under a propagation license with those held under a permit issued for scientific, zoological or rehabilitation purposes; require that fur-bearing animals are to be maintained in approved facilities at all times and that facilities for furbearers be separate from facilities maintained under any other permit and provides bag and possession limits for licensed hunters; provide that only licensed trappers, furbearer propagators, retail furbuyers and wholesale fur dealers may sell pelts of fur-bearing animals and that only licensed furbuyers and wholesale fur

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dealers may purchase pelts of fur-bearing animals; require fur-bearing animal propagators to report the number and kinds of furbearers purchased, whom the purchase was made from, and to report to whom sales are made; require a completed application for import of live fur-bearing animals and require the applicant to furnish a certification from the State Veterinarian that the area in which the facility is located has been free of rabies for the previous 12 months and the imported furbearers are offspring of captive reared stock; require a health certificate showing three negative fecal flotation tests on three separate days and shipments to be accompanied by official interstate health certificate; require that animals held by propagators could not be released into the wild; provide for suspension and revocation of licenses or permits for violation of these rules; and provide that penalties for violation of these rules are prescribed by Texas Parks and Wildlife codes, 71.015.

4. Summary of Comments.

Comments concerning the proposed rules were submitted by the Commissioner of Health and stated that to ensure that the propagation permit does not allow a holder to keep raccoons as a pet, the Department should require the confinement of the animal in the approved facility, not the permit holder's house. These requirements are important from a human health and safety aspect, as they will help decrease exposure to bites, rabies, and/or parasites. Raccoons are defined as high risk animals for transmitting rabies in the Rules of the Board (Rabies Control and Eradication: 169.22).

5. Names of The Group Making Comments For and Against the Rules as proposed in the Texas Register.

The Texas Department of Health opposed the rule allowing fur propagators to have raccoons as pets and opposed fur propagators using their home as a facility.

6. Reasons Why Agency Disagrees With Comments.

The restrictions requested by the Commissioner of Health were not initially proposed by the Department. Since such significant changes were not initially proposed they could not be adopted without republication.

7. Statutory Authority; Interpretation of How Provisions Authorize or Require the Rules.

New rules and amendments are adopted under Texas Parks and Wildlife Code, Chapter 71, which provides the Texas Parks and Wildlife Commission with the authority to adopt regulations for the taking, possession, propagation, transportation,

exportation, importation, sale, and offering for sale of fur-bearing animals, pelts and carcasses as the commission consider necessary to manage fur-bearing animals or to protect human health or property.

The adopted rules and amendment changes of the fur-bearing proclamation are summarized as follows:

The amendment to §65.372 redefines resident to conform with statutory language.

The amendment to §65.373 reflects increased fees for trappers, retail furbuyers, wholesale fur dealers and fur-bearing animal propagation license.

The new rule, §65.374, provides that a person possessing a hunting license may take a fur-bearing animal if the taking is not for sale, barter or exchange and the take does not exceed the daily bag limit or possession limit established by the Commission.

The amendment to §65.376 prohibits import of live fur-bearing animals taken from the wild, authorizes the import of offsprings of fur-bearing animals derived from captive stock and prohibits the commingling of fur-bearing animals held under a propagation license with a permit issued for scientific, zoological or rehabilitation purposes.

The amendment to §65.378 requires that fur-bearing animals are to be maintained in approved facilities at all times and that facilities for furbearers be separate from facilities maintained under any other permit and provides bag and possession limits for licensed hunters.

The amendment to §65.380 provides that only licensed trappers, furbearer propagators, retail furbuyers and wholesale fur dealers may sell pelts of fur-bearing animals and that only licensed retail furbuyers and whole fur dealers may purchase pelts of fur-bearing animals.

The amendments to §65.381 would require fur-bearing animal propagators to report the number and kinds of fur-bearers purchased, whom the purchase was made from, and to report to whom sales are made.

The amendments to §65.382 requires a completed application for import of fur-bearing animals and requires that the applicant furnish: (1) certification from the State Veterinarian that the area in which the facility is located has been rabies free for the previous 12- months; (2) a notarized document verifying that the imported fur-bearing animals are offsprings of captive-reared stock; (3) an export authorization from the state or county of origin, and (4) a health certificate showing three negative fecal flotation tests on three separate days. Shipments are to be accompanied by official interstate health certificate. Also, animals held by propagators can not be released into the wild.

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New rule, §65.383, provides for suspension and revocation of licenses or permits for violation of these rules.

The amendment to §65.389 provides that penalties for violation of these rules are prescribed by Texas Parks and Wildlife codes, §71.015.

§65.371. Application.

These sections apply to fur-bearing animals statewide, except Texas Parks and Wildlife Code, §81.404 (relating to contract removal of fur-bearing animals on management areas), Chapter 43, Subchapter C (relating to scientific permits), and sections 229.021, 334.041 and 360.021 (relating to the sale of certain live animals in Kaufman, Van Zandt and Wood counties) are not affected by this subchapter.

§65.372. Definitions.

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise:

Carcass - The body of a dead fur-bearing animal, with or without the hide attached, Texas Parks and Wildlife Code, §71.001(9).

Commission - The Texas Parks and Wildlife Commission.

Department - The Texas Parks and Wildlife Department or a specifically authorized employee of the department.

Fur-bearing animal propagator - A person who takes or possesses a living fur-bearing animal and holds it for the purpose of propagation or sale, Texas Parks and Wildlife Code, §71.001(13).

Nonresident - Any person applying for a trapper's license other than a resident, Texas Parks and Wildlife Code, §71.001(6).

Nuisance - An offensive, annoying, or unpleasant situation, event or act involving fur-bearing animals that may negatively affect human health or safety.

Pelt - The untanned, green or dried hide or skin of a fur-bearing animal, whether or not the hide or skin is attached to the carcass, Texas Parks and Wildlife Code, §71.001(11).

Place of business - A place where fur-bearing animals or their pelts are sold, received, transported, possessed, or purchased, and includes a vehicle used by a trapper, retail fur buyer, wholesale fur dealer, or fur-bearing animal propagator, Texas Parks and Wildlife Code, §71.001(12).

Possess - The act of having control of a fur-bearing animal but does not include take.

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Resident - An individual who has resided continuously in this state for more than six months immediately before applying for a license issued under this subchapter, Texas Parks and Wildlife Code, Chapter 71.

Retail fur buyer - A person who purchases a fur-bearing animal or the pelt of a fur-bearing animal of this state from trappers only, Texas Parks and Wildlife Code, §71.001(3).

Sale - Includes barter and other transfers of ownership for consideration, Texas Parks and Wildlife Code, §71.001(7).

Take - The act of snaring, trapping, shooting, killing or capturing by any means and includes an attempt to take, Texas Parks and Wildlife Code, §71.001(8).

Trapper - A person who takes a fur-bearing animal or the pelt of a fur-bearing animal, Texas Parks and Wildlife Code, §71.001(2).

Wholesale fur dealer - A person who purchases for himself or for another person a fur-bearing animal or the pelt of a fur-bearing animal of this state from a trapper, retail fur buyer, a fur-bearing animal propagator, or another wholesale fur dealer, Texas Parks and Wildlife Code, §71.001(4).

§65.378. License Fees.

(a) The fees for licenses required for activities authorized by this subchapter are prescribed under the provisions of Texas Parks and Wildlife Code, Chapter 71, and are:

- (1) \$15.00 for a resident trapper's license;
- (2) \$250.00 for a nonresident trapper's license;
- (3) \$75.00 for a resident retail fur buyer's license;
- (4) \$300.00 for a nonresident retail fur buyer's license;
- (5) \$150.00 for a resident wholesale fur dealer's license;
- (6) \$500.00 for a nonresident wholesale fur dealer's license; and
- (7) \$75.00 for a fur-bearing animal propagation license.

§65.374. License Requirement.

(a) Except as provided by subsection b of this section no person may take a fur-bearing animal or a pelt in this state unless the person has acquired and possesses a trapper's license.

(b) A person who possesses a hunting license and is engaged in a lawful hunting activity for any species other than fur-bearing animals may take and possess a fur-bearing animal if:

- (1) neither the fur-bearing animal nor any part of that animal is taken for the purpose of sale, barter, or exchange; and

- (2) the number of fur-bearing animals taken does not exceed the daily bag limit or possession limit set by commission regulation.

§65.375. Reserved for future expansion.

§65.376. General Rules.

(a) Fur-bearing animals may be taken in any number at any time, except as otherwise restricted by this subchapter.

(b) This subchapter shall not prohibit a landowner or his agent from taking by any means a fur-bearing animal causing depredation or nuisance on that person's land or prohibit a person from transporting a suspected diseased fur-bearing animal to a public health facility.

(c) Except for nutria, fur-bearing animals or pelts, taken under subsection (a) or (b) of this section may not be retained or possessed by any one at any time except during the open season and possession periods as provided by this subchapter provided that depredating and nuisance live fur-bearing animals taken under subsection (b) of this section may be possessed only during transport for release under provisions of §65.382(e) of this title (relating to Importation and Release of Fur-Bearing Animals or Their Pelts).

(d) No person may take a fur-bearing animal on any privately-owned land or body of water without the consent of the owner of the land or water or the owner's agent.

(e) No person may take fur-bearing animals on statutory wildlife sanctuaries, on public roads and highways, or rights-of-way of public roads and highways, and in the state-owned riverbeds in Uvalde, Zavala, and Dimmit counties.

(f) Each fur-bearing animal or pelt taken or possessed in violation of this subchapter shall constitute a separate offense.

(g) This subchapter shall not prohibit personnel of the Texas Department of Health or local public health agencies from taking and possessing for analysis and disposal any fur-bearing animal posing a potential or known health hazard. All animals handled pursuant to this paragraph shall be accounted for in a report from the Department of Health by January 30 following the year of handling. The report shall include the number of individuals handled of each species, month and county of take, and category of clinical processing or diagnosis. More inclusive Department of Health reports may be substituted in the event they duplicate the information required by this subsection.

(h) This subchapter shall not apply to the Texas Animal Damage Control Program U.S. Department of Agriculture (Texas Rodent and Predatory Animal Control Service - Texas Animal Damage Control Association) in the fulfillment of their responsibility as mandated by state laws. All animals handled

pursuant to this subsection shall be accounted for in a report from the U.S. Department of Agriculture by January 30 following the year of handling. The report shall include the number of individual animals handled by species and county of take. More inclusive reports may be substituted in the event they duplicate the information required by this subsection.

(i) No person may possess a live skunk or civet cat without specific written authorization from the department.

(j) Importation of live raccoons is prohibited.

(1) No person may import into this state or possess after importation a live raccoon.

(2) This section does not prohibit a common carrier, circus, carnival or medical research institution from transporting a live raccoon through this state.

(k) Importation of other live fur-bearing animals.

(1) No person may import into this state or possess after importation a live fur-bearing animal taken from the wild.

(2) Offspring of fur-bearing animals, other than raccoon, derived from captive reared stock that are maintained in facilities licensed by the state or country of origin may be imported into this state and possessed for propagation purposes or sale in accordance with §65.382 of this title (relating to importation of fur-bearing animals or their pelts).

(3) This section does not prohibit a common carrier, circus, carnival or medical research institution from transporting live fur-bearing animals taken from the wild through this state.

(l) Fur-bearing animals obtained from the wild under the authority of a permit issued pursuant to Subchapter C, Chapter 43, Parks and Wildlife Code shall not be commingled with fur-bearing animals held under a fur-bearing animal propagation license.

§65.377. Open Seasons.

(a) No person may retain or possess a fur-bearing animal or the pelt of a fur-bearing animal except during the open season as provided in this section, or as specifically provided elsewhere.

(b) Open seasons are given by their opening and closing dates. All dates are inclusive.

(c) The open seasons are:

- (1) Muskrat - November 15 of one year through March 15 of the following year.
- (2) Nutria - January 1 through December 31.

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(3) Beaver, otter, mink, ring-tailed cat, badger, skunk, fox, opossum, raccoon, and civet cat - December 1 of one year through January 31 of the following year.

(d) A person holding a fur-bearing animal propagation license may take fur-bearing animals alive only during the open season for the taking of fur-bearing animal species as provided in this section.

§65.378. Possession of Fur-bearing Animals or Their Pelts.

(a) Except as provided by this section, no person may possess the pelt of a fur-bearing animal at any time other than the open season as provided in §65.377 of this subchapter (relating to Open Seasons).

(b) No person other than licensed trappers, retail fur buyers, wholesale fur dealers or fur-bearing animal propagators may possess the pelt of a fur-bearing animal during the open season.

(c) No person other than the holder of a fur-bearing animal propagation license may possess a live fur-bearing animal at any time except as provided in this subchapter and such propagation license may be issued each license year only after holding facilities are examined by a representative of the department and are found to adequately provide at all times freshwater, sanitary bedding area, shelter from heat and inclement weather, and the following minimum space and height specifications are met for each animal confined.

SPECIES	Minimum Specifications	
	Height (inches)	Space (sq. ft.)
Badger	15	6-1/2
Beaver	20	7-1/2
Fox, Gray	18	6
Fox, Kit	15	5
Fox, Red	18	6
Fox, Swift	15	4-1/2
Mink	12	3-1/2
Muskrat	12	2-1/2
Nutria	15	5
Opossum	12	4-1/2
Otter, River	18	7
Raccoon	18	6

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Ringtail	15	4
Skunk, Spotted (Civet)	12	3
Skunk, Other	15	4

Minimum requirements shall be met for all fur-bearing animals held at any time except that young may be confined with their parents or with siblings until 120 days of age without meeting minimal floor space requirements for other than that necessary for one adult animal and animals may be confined for pelting purposes from 45 days prior to the open fur season until 20 days after the open season for each species without meeting minimum floor space requirements.

(d) Live fur-bearing animals shall be maintained at all time in facilities approved by the department.

(e) Facilities for fur-bearing animals held under a propagation permit shall be a minimum of 1000 feet from facilities for holding fur-bearing animals under a permit issued under Subchapter C, Chapter 43 of the Parks and Wildlife Code. This restriction may be waived by the department on a case-by-case basis if the department finds the restriction represents an undue hardship on the permit holder due to circumstances beyond his or her control.

(f) The possession of more than one undried (green) pelt of a fur-bearing animal after the time specified by subsection (g) of this section by a licensed trapper, retail fur buyer, or fur-bearing animal propagator is a violation of this subchapter.

(g) The times are as follows:

(1) For undried (green) pelts of all fur-bearing animal except muskrat and nutria:

(A) February 5 of each year by licensed trappers;
(B) February 20 of each year by licensed retail fur buyers and fur-bearing animal propagators.

(C) No time limitation for wholesale fur dealers.

(2) For undried (green) pelts of muskrat:

(A) March 20 of each year by licensed trappers;
(B) March 30 of each year by licensed retail fur buyers and fur-bearing animal propagators.

(C) No time limitation for wholesale fur dealers.

(3) For nutria: no restrictions.

(4) For all fur-bearing animals, one (1) animal may be taken per day and one (1) carcass may be possessed outside of the open seasons specified in §65.377(c) of this title (relating to Open Seasons), except that no pelt or carcass of these species may be possessed under this paragraph during the 30 days preceding and the 30 days following the specified open seasons. Fur-bearing animals, pelts, and carcasses possessed under this paragraph may not be sold.

(5) Licensed trappers, retail buyers, and wholesale dealers may possess and market dried pelts year-round.

(6) A person who possesses a valid hunting license and is engaged in a lawful hunting activity for any species other than fur-bearing animals may take one (1) fur-bearing animal per day and possess not more than two (2) fur-bearing animals at any time. Fur-bearing animals, pelts, and carcasses possessed by licensed hunters under the authority of this paragraph may not be sold, bartered or exchanged.

(h) Nothing in this subchapter shall prohibit a taxidermist from possessing for taxidermy purposes a fur-bearing animal or the pelt of a fur-bearing animal lawfully taken or possessed under this subchapter provided the animal or pelt is labeled with the name and address of the owner of the animal or pelt.

(i) Live fur-bearing animals may be taken and possessed for three days or less by persons representing recognized furbearer associations or related service organizations for approved instructional or demonstration purposes in conjunction with scheduled meetings of the organizations provided prior written authorization for such take and possession has been issued by the department at its discretion based on the activities proposed. Fur-bearing animals thus possessed shall be released to the wild as directed by the department.

§65.378. Means and Methods.

(a) Only the following means and methods are legal for taking fur-bearing animals:

- (1) firearms;
- (2) steel leghold and conibear style traps;
- (3) falconry;
- (4) live or box trap;
- (5) dogs;
- (6) snare;
- (7) longbow and arrow;
- (8) electronic or hand-held calls; and
- (9) artificial light.

(b) Exceptions - No person may:

- (1) take river otter with firearms;
- (2) shoot at, take or attempt to take any fur-bearing animal from a boat on public waters of this state;
- (3) take fur-bearing animals by means of falconry, unless the person holds a valid falconry permit issued by the department;
- (4) possess a firearm or longbow and arrow or be accompanied by a person possessing a firearm or longbow and arrow while taking fur-bearing animals by means of falconry;
- (5) take fur-bearing animals with steel leghold or conibear style traps, except during the open season provided by §65.377 of this title (relating to Open Seasons);
- (6) take fur-bearing animals with steel leghold or conibear style traps within 400 yards of any school or conibear style traps with a diagonal opening dimension greater than 10 inches set on land or in less than six-inch deep water;
- (7) use smoke, explosives or chemicals of any kind to kill or flush fur-bearing animals in the wild; and
- (8) take fur-bearing animals with snares, steel leghold traps, conibear style traps, live or box traps unless such devices are examined and captured animals are removed every 36 hours.

§65.380. Sale or Purchase of Fur-bearing Animals or Their Pelts.

(a) No person other than licensed trappers, retail fur buyers, wholesale fur dealers, or fur-bearing animal propagators may sell the pelts of fur-bearing animals, and no person other than licensed retail fur buyers, or wholesale fur dealers may purchase the pelts of fur-bearing animals.

(b) The pelt of a fur-bearing animal may be purchased or sold only during those periods established by §65.377 of this subchapter (relating to Open Seasons) and §65.378 of this subchapter (relating to Possession of Fur-Bearing Animals or Their Pelts).

(c) Live fur-bearing animals may be sold only by a person who holds a valid fur-bearing animal propagation license, and such live animals may be sold only to persons authorized by permit issued under Texas Parks and Wildlife Code, Chapter 43, Subchapter C, or to another licensed fur-bearing animal propagator. Written authorization shall be obtained from the department prior to sale or export of live fur-bearing animals to persons outside of Texas. Requests for authorization shall include written documentation verifying that the recipient of live animals has complied with importation, transportation, and possession regulations applicable to the species in the destination state. A copy of the completed authorization shall

accompany any live fur-bearing animal being exported or be attached to any container used to export live fur-bearing animals.
§65.381. Purchase/Sale Reports.

(a) A report on a form provided by the department must be completed and filed with the department by a person licensed as a retail fur buyer, wholesale fur dealer, or a fur-bearing animal propagator in accordance with this section.

(1) A person licensed as a retail fur buyer or wholesale fur dealer shall file the report on or before April 30 of each year.

(2) A person licensed as a fur-bearing animal propagator shall file the report required on or before August 31 of each year.

(b) Information for each license type shall include but not be limited to:

(1) Retail fur buyer - name and license number; total number and kinds of pelts purchased; and number and kinds of pelts sold.

(2) Wholesale fur dealer - name and license number; total number and kind of pelts purchased; and number and kinds of pelts sold.

(3) Fur-bearing animal propagator - number and kinds of animals possessed on date of report; number and kinds of live fur-bearing animals purchased or sold; license number or permit number, name and address to whom each live fur-bearing animal was purchased from or sold to; the number and kinds of pelts sold; and the license number, name and address to whom the pelt(s) were sold.

(c) A person licensed as a retail fur buyer, wholesale fur dealer or fur-bearing animal propagator shall not be eligible for renewal of the license unless the requirements in subsection (a) of this section have been met.

§65.382. Importation and Release of Fur-bearing Animals or Their Pelts.
(a) No person may import the pelts of fur-bearing animals into this state from another country without first obtaining necessary documentation for a declaration for importation of fish or wildlife as required by the United States Fish and Wildlife Service and the U.S. Customs Service.

(b) No person other than a licensed fur-bearing animal propagator who holds a valid fur-bearing animal import permit issued by the department may import live fur-bearing animals into this state from another state or country.

(1) A fur-bearing animal import permit may be obtained as follows:

(A) Fur-bearing animal propagator - upon application to the department on forms provided for fur-bearing animal import,

(i) the application shall show the name, address and fur-bearing animal propagator's license number of the applicant; the name and license number of the consignee, species and number to be imported and purpose for import;

(ii) each application for a fur-bearing animal import permit shall be accompanied by a certification from the State Veterinarian that the County, Township, or Parish of the state or county of origin in which the facility is located has been rabies free for the previous 12 months; a notarized document verifying each animal to be imported is an offspring from captive reared stock; an export authorization from state or country of origin (or letter of exemption) and a health certificate which verifies three negative fecal flotation tests on three separate days for each animal within a ten-day period immediately prior to application.

(c) Each shipment must be accompanied by an official interstate health certificate/certificate of veterinary inspection and a copy of the completed import permit issued by the department.

(d) Imported live fur-bearing animals except raccoon and live fur-bearing animals previously held in captivity in this state under a fur-bearing animal propagator's permit may not be released into the wild.

(e) Nuisance or depredating fur-bearing animals taken under provisions of §65.376(b) may be possessed during transport for release into the wild with the written consent of the department. Animals released under provision of this subsection must be accounted for in a report filed with the department on or before the tenth day of each month. The report shall list the species, number captured, date and location of capture, number released, date and location of release, and name and address of person authorized to release.

§§65.383-65.388. Reserved for future expansion.

§65.389. Penalty.

The penalties for a violation of this subchapter are prescribed by Texas Parks and Wildlife Code, §71.015 and 71.016.

This agency hereby certifies that the new rules and amendment changes as adopted has been reviewed by legal counsel and found to be a valid exercise of the agency's legal authority.

Attachment B. Report of swift fox in Carson County, Texas

REPORT

Contract No.

DE-AC04-94AL98863

Subcontract No.

030651

Swift Fox Survey at Pantex Site, Carson County Texas

1995

by

Department of Biology and Geosciences

West Texas A&M University

Canyon, Texas 79016

Kathleen B. Blair, Principal Investigator

September 1995

Introduction

The swift fox (*Vulpes velox*) is a small (1.8-2.95 kg or 3-6 lbs) canid native to the short grass prairies of North America (Davis 1978, Egoscue 1979) whose population may be in decline (Alderton 1994, Davis 1978, Egoscue 1979) and is consequently listed as a category 1 species on the Federal Endangered Species Act listing (Federal Register 1995). Since the Pantex facilities in Carson Co. in the Texas Panhandle are within the historic range of this species (Stromberg and Boyce 1986), retain generally suitable habitat and have had past reports (Rylander 1994) indicating the possible presence of this species it was important to survey the area to determine if evidence existed indicating swift foxes might still be present.

Compared to most carnivores, relatively little is known about the natural history of the swift fox. Of the few reports available for the species generally even less information has been gathered for the area of the southern high plains. This small, very nocturnal fox about the size of a large house cat probably lives in pairs and breeds once a year producing 3-6 pups (Caire et. al. 1989). Kilgore (1969) believes the species probably pairs for life but may occasionally be polygynous. Pups are generally born between February and April but do not begin to follow the parents until they are about 3 months old (or about May through July) according to Alderton (1994). Davis (1978) indicated that in Texas pups are born in March or April which would put them beginning to follow the parents in approximately June and July.

Studies in the Oklahoma Panhandle indicated that rabbits are the most important prey item but small rodents, small ground dwelling birds, reptiles and many insects are all consumed (Kilgore 1969, Zumbaugh et. al. 1985). In Hansford county, Texas Cutter (1958) also found rabbits to be the most commonly found item in scats followed by passerine birds, grasshoppers, beetles and crickets.

Cutter (1958) observed these foxes den primarily in the Texas Panhandle in overgrazed pastures. Of 25 dens examined by him, 19 were in open pastures, 2 in plowed fields and 4 along north/south fence rows. Three of the 25 were within 100 meters of human habitation. Of 35 dens examined by Kilgore (1969) in the Oklahoma Panhandle 16 were in cultivated fields, 15 in short-grass pastures, 2 in cemeteries and 1 in a culvert. Six of the 15 in pastures were near playas. He indicated that most of the dens in cultivated fields were used only temporarily, had short tunnels and a single entrance. The whelping dens were usually in the pastures with multiple entrances, had long tunnels and were associated with higher ground, slopes, hill tops or other well

drained areas. Den openings averaged 8 inches in diameter which distinguishes them from all other co-occurring species in the Texas panhandle except possibly striped skunks (Table 1). Prairie dog burrows may be enlarged for den sites by this species although it usually digs it's own (Davis 1978, Kilgore 1969). There is evidence that, although the species is not strongly territorial, they do occasionally mark with scats close to the den (Alderton 1994). Suitable dens may be reused with the complex of openings and accumulated sub-surface soil forming distinct ecological units in their own right creating a favorable microclimate for many other species of vertebrates and invertebrates (Egoscue 1979).

Tracks of this species can be distinguished from other species, including other canids, in the Texas panhandle by their size and conformation (Figure 1). In addition they are relatively shallow in depth when compared to other species due to the swift fox being a much lighter animal with a maximum weight of only ~~only~~ about 5 lbs compared to the coyote (up to 30 lbs), red fox (15 lbs,) and grey fox(16 lbs) according to Caire et. al. 1989.

Methods

A visual examination of the suitable habitat areas at Pantex was made during the August of 1995 to determine if swift fox sign were present. Areas examined included the Pantex installation proper (approximately 9,000 acres), the Texas Tech agricultural fields (approximately 6,000 acres) and Pantex Lake (approximately 1,500 acres). The sign looked for included tracks (with determination of juvenile or adult age class if possible), scats, old and active dens. The latter were mapped. Suitable habitat areas were walked to detect these sign. Approximately 22 of the 25 square miles of the combined DOE and Texas Tech lands were walked as well as 2 square miles at Pantex lake. Conservation Reserve Program grasslands on Texas tech lands were not extensively examined except along edges due to the height and density of vegetation making it impossible to see ground level sign or dens. Areas inside the DOE compound proper also have not been examined due either to reasons of security or unsuitability of the habitat. The walking survey was carried out with project personnel spaced at approximately 15 meter intervals and walking in parallel lines to cover the above listed areas. Examination concentrated on prairie dog towns (4 towns with an approximate total of 900 acres), playa edges (6 playas with approximately 1200 acres), fence rows and road sides (approximately 150 total miles), pastures with fences, old road beds, interior areas with higher ground, ridges or such features which could be attractive to

Table 1. Den characteristics of den using species from the Texas Panhandle.

Species	Characteristics
<i>Vulpes velox</i>	7-8" round with trench common, dig own or occasionally enlarge prairie dog burrow. 1- multiple entrances
<i>Vulpes fulva</i> (= <i>vulpes</i>)	10-15" round to oblong - strong odor, several entrances, often near water prefer loose, sandy soil
<i>Urocyon cinereoargenteus</i>	10- 12", usually use pre-existing holes, 1-entrance well hidden
<i>Canis latrans</i>	10" wide x 20 high", often enlarge badger dens
<i>Mephitis mephitis</i>	6-8+" most often natural crevice or dug by other species - strong odor and permanent water usually nearby, 1 entrance
<i>Spilogale putoris</i>	4-6" usually natural crevice or dug by other species - strong odor
<i>Taxida taxus</i>	12-14" often wider than high, multiple entrances common
<i>Cynomys ludovicianus</i>	4-5", distinct mound hard packed, towns

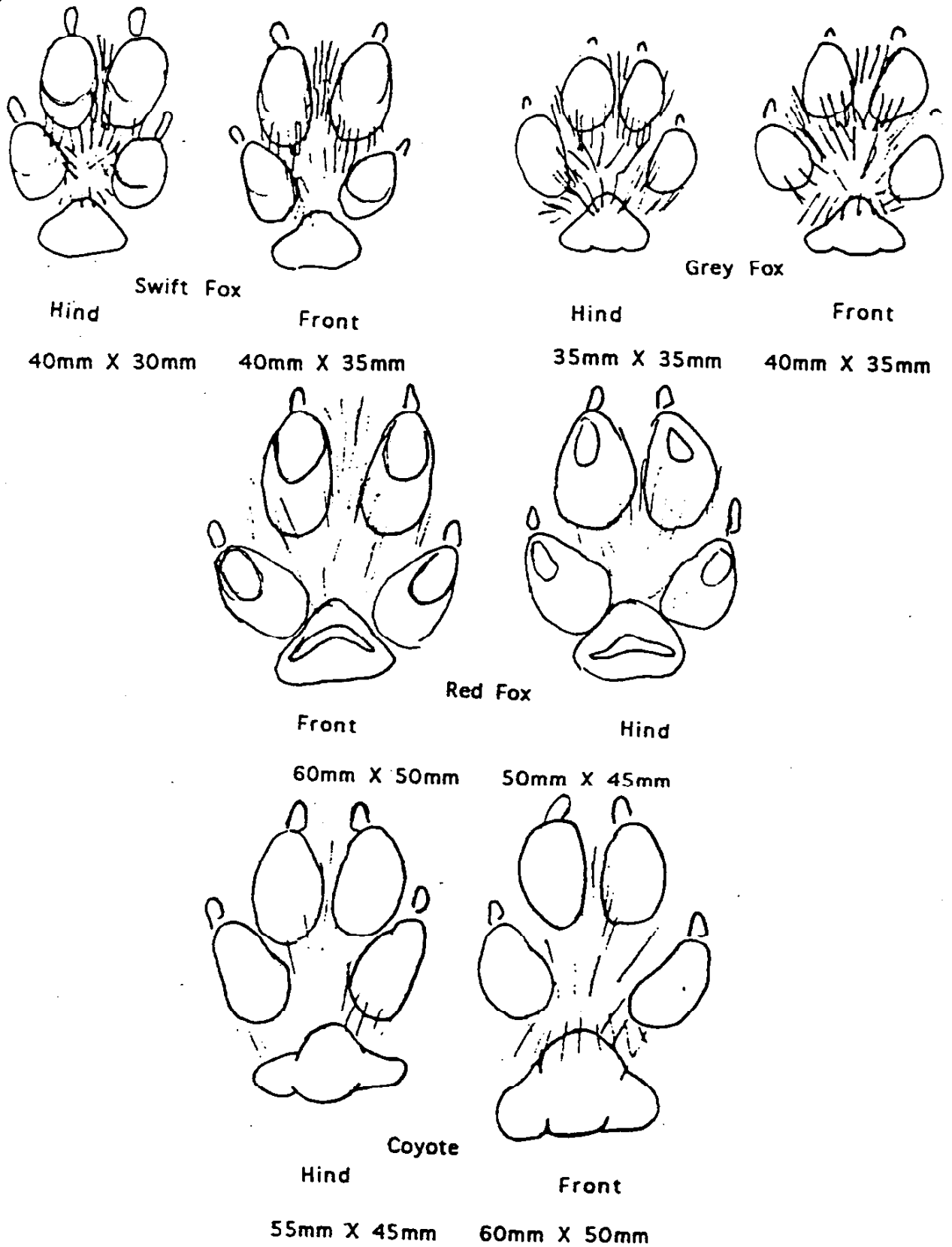


Figure 1. Life size tracks of canids in the Texas Panhandle.

the foxes for den sites as well as the edges of cultivated fields (both fallow and in crops) and old structures such as abandoned buildings, dumps, road and rail beds.

In addition 7 scent stations baited with raw eggs were established in areas where swift foxes were suspected to try and obtain additional tracks. FaunaWest (1991) cites Linhart and Knowlton (1975), Zegers (1976) and Muchmore (1975) as indicating that scent post and tracking surveys are the most effective way to survey for swift fox populations as individuals are readily attracted to scent stations. Muchmore (1975) reported 13 swift fox visits, 23 red fox visits and 41 coyote visits at 100 scent posts in a 5 day period in Wyoming. Plaster of Paris casts were taken of tracks and scats were collected with photographic documentation of dens where possible when Pantex personnel were available.

Spot lighting was not ~~been~~ attempted due to high security at the plant but can be useful in locating and confirming the presence of this species (Hillman and Sharps 1978, Sharps and Whitcher 1984).

Results

Tracks

Seven sets of swift fox tracks were noted at Pantex lake, W of Playa 2, in an open pasture and at the edge of a plowed field NE of Playa 1 and in a wheel rut SW of Playa 3. Plaster casts of 4 sets of tracks (including 18 total tracks) were obtained. Two sets of tracks were seen in dust too fine to lift as plaster casts. One track was found NW of Playa 2 which was extremely faint even in soft mud that clearly showed an adult swift fox track approximately 3 inches away. This track was too faint to show clearly in a plaster cast but was about 1/2 the size and 1/2 the depth of the adult track. It may be that of a pup but was too faint to be certain of identification.

Dens

One-hundred seventy four dens which match all available known criteria of swift fox (size, shape and placement) have been noted in the higher ground associated with all 6 playas, in most pastures, near abandoned buildings and roads, prairie dog towns and the edges and fences surrounding cultivated fields (Table 1, Figure 1 and Figure 2). Scat and tracks consistent with swift fox were found in the entrances of 1 den at the old water treatment plant (Zone 15) which also had 7 large turtle eggs cached just inside the entrance. In addition tracks were found at the entrance of 1 fresh den at Pantex Lake as well. Dens found included both the single, isolated day-use holes of individuals as well as the multi-entrance complexes typical of swift fox whelping dens. Apparent whelping dens included old (3+ years old) moderate (2-3 years old) and recent (probably this

Table 2. Results of visual, walking survey of Pantex site for Swift fox sign.

Habitat	Sign			
	Track Sets	Day Dens	WhelpingDens	Scats
Playas and associated pasture land				
Pantex Lake	1	17	3	0
Playa 1	0	6	1	0
Playa 2	3	33	5	0
Playa 3	1	3	0	0
Playa 4	0	9	2	0
Playa 5	0	10	3	0
Pasture not associated w/ playa	1	7	1	0
Cropland				
Plowed	1	2	1	0
Production	0	6	1	0
Abandoned structures				
Roads/railroad beds	0	5	0	0
Buildings (Zone 9)	0	10	0	1
WW2 Bunkers (Zone3)	0	12	0	0
Burms (NW corner of site)	0	35	2	0
Security & high use areas (Zones 10 &12)	0	0	0	0
TOTAL	7	155	19	1

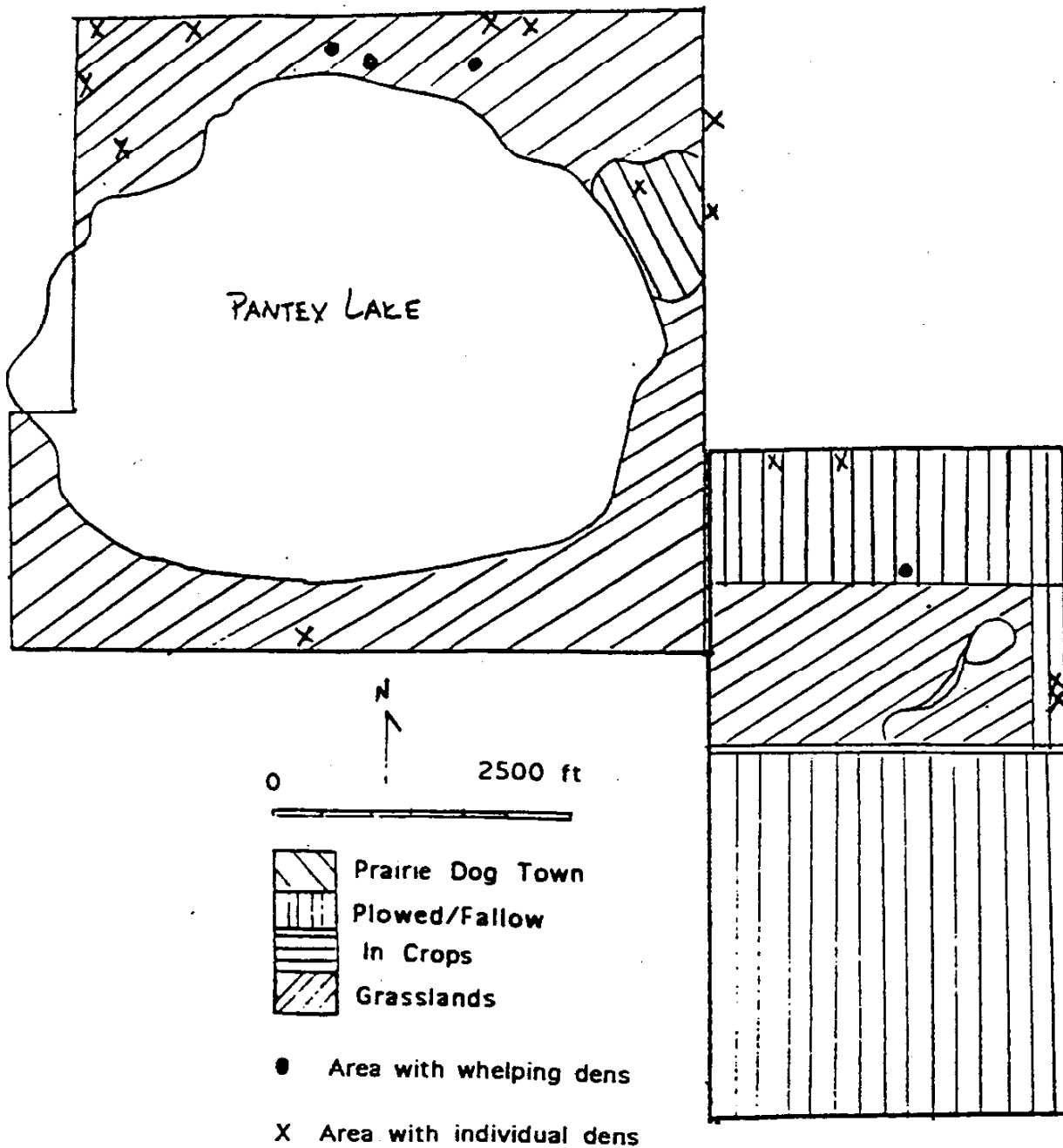


Figure 2. Map of swift fox sign at Pantex Lake.

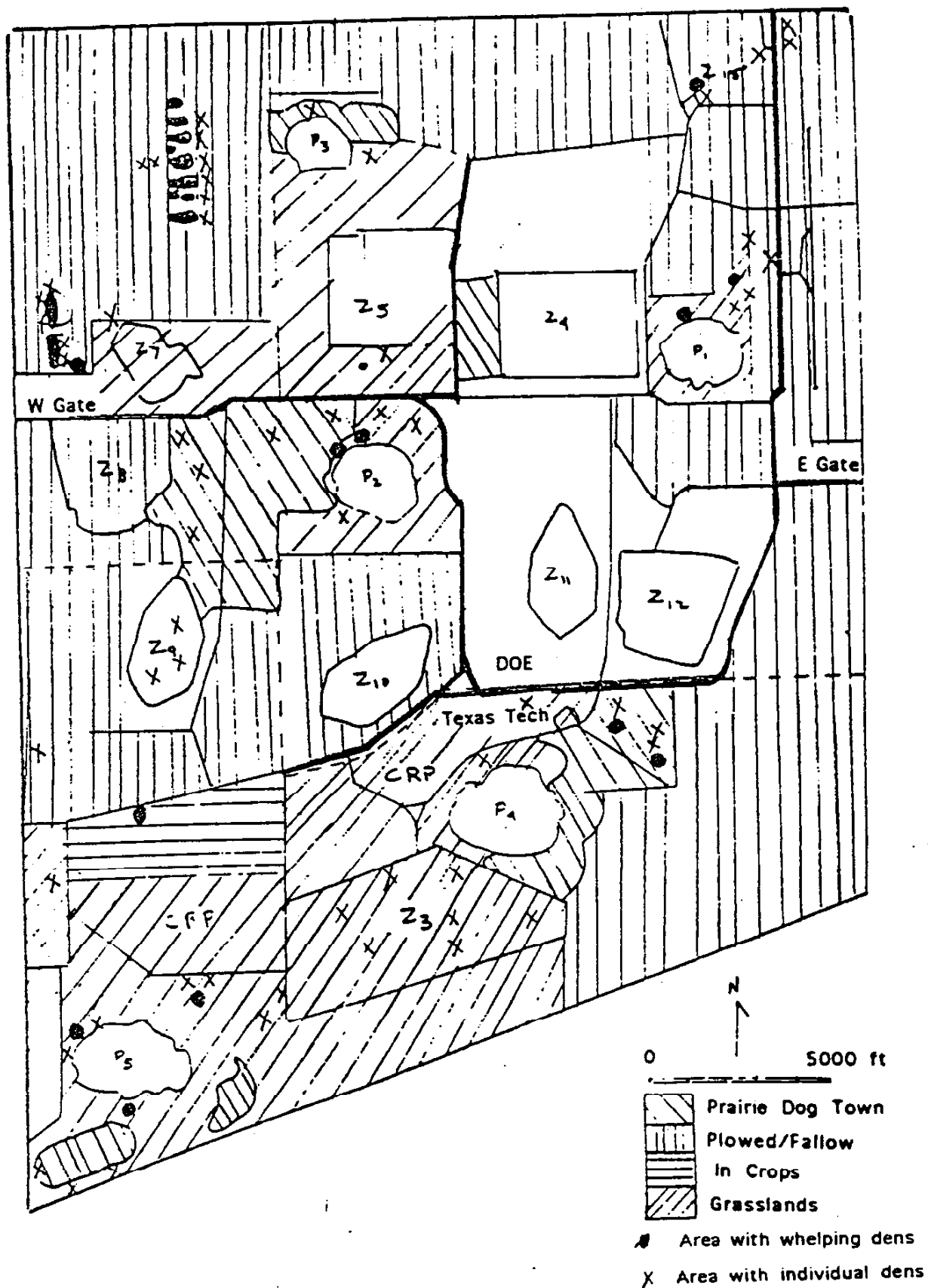


Figure 3. Map of swift fox sign on Pantex site and Texas Tech areas.

past spring) age based on vegetative succession and often dens of all ages were within approximately 100 meters of one another indicating repeated use of particular areas. These repeat use areas were all associated with playas. Individual day dens (these are often one-time use shelters) were also of diverse apparent ages from several years old to only a few hours old based on soil and vegetation conditions. Dens larger or smaller than the 7-8" diameters were not counted as swift fox although some may have belonged to this species.

Scent stations were attempted but the soil and wind conditions proved to be largely unsuitable for holding tracks except near pockets of water or playas and these areas also attracted cattle which trampled the scent stations.

Other Species


In addition to *Vulpes velox*, other vertebrate species were noted during this survey in the form of tracks, scats or visual observations. These included:

Mammals

Myotis sp. (Vesper bat), *Scalopus aquaticus* (Eastern Mole), *Canis latrans* (Coyote), *Urocyon cinereoargenteus* (Gray Fox), *Mephitis mephitis* (Striped Skunk), *Procyon lotor* (Raccoon), *Taxida taxus* (Badger), *Sylvilagus audubonii* (Audubon's Cottontail), *Sylvilagus floridanus* (Eastern Cottontail), *Lepus californicus* (Blacktailed Jackrabbit), *Pappogeomys castanops* (Chestnut-faced Pocket Gopher), *Cynomys ludovicianus* (Prairie Dog), *Spermophilus tridecemlineatus* (13-lined Ground Squirrel), *Neotoma* sp. (Woodrat)

Birds

Buteo regalis (1 pair)(Ferruginous Hawk), *Buteo swainsoni* (2 pairs)(Swainson's Hawk), *Buteo jamaicensis* (Red-tailed Hawk), *Circus cyaneus* (Northern Harrier), *Tylo alba* (2 pairs) (Barn Owl), *Bubo virginianus* (1 pair)(Great Horned Owl), *Athene cunicularia* (Burrowing Owl), *Zenaidura macroura* (Mourning Dove - with eggs) *Numenius americanus* (Long Billed Curlew), *Bartramia longicauda* (Upland Sandpiper), *Tringa melanoleuca* (Greater Yellowlegs), *Calidris mauri* (Western Sandpiper), *Charadrius vociferus* (Killdeer), *Corvus cryptoleucus* (Chihuahuan Raven - 1 pair), *Anas platyrhynchos* (Mallard - with eggs), *Tyrannus vociferans* (Cassin's Kingbird), *Tyrannus verticalis* (Western Kingbird), *Agelaius phoeniceus* (Red-winged Blackbird), *Molothrus ater* (Brown-headed Cowbird), *Calamospiza melanocorys* (Lark Bunting), *Ammodramus savannarum* (Grasshopper Sparrow), *Lanius ludovicianus* (Loggerhead Shrike)



Reptiles

Phrynosoma cornutum (Texas Horned Lizard - 4 individuals), *Crotalus viridis* (Prairie Rattlesnake - 26), *Coluber constrictor flaviventris* (Yellow-bellied Ratsnake - 1), *Thamnophis marcianus marcianus* (Checkered Gartersnake - 2), *Eumeces obsoletus* (Great Plains Skink - 2).

Amphibians

Ambystoma tigrinum (Tiger Salamander)

Discussion

Based on these data it seems quite probable that swift foxes are indeed present on Pantex facilities. Day use dens appeared in nearly all habitats surveyed but whelping dens were largely restricted to areas near the playas. Most of these whelping den sites showed re-current use with old (over 3 years old), moderately old (1-2 years old) and fresh (this year) use. It is not possible to estimate population size, specific habitat use or reproductive success based on these data, however. Confirmation of whelping den use would need to be carried out in the spring.

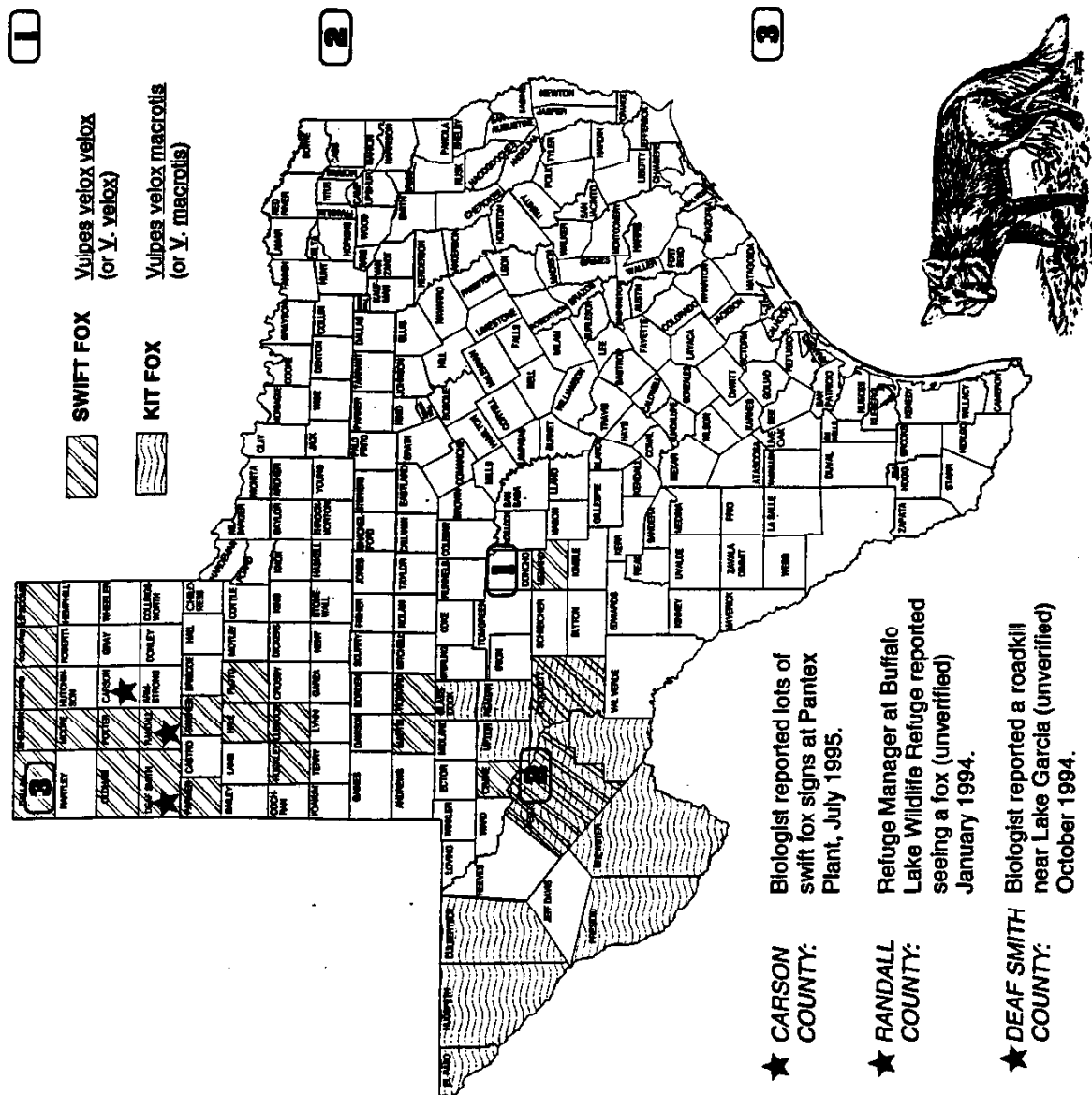
Estimates of swift fox home ranges published in the literature vary. Scott-Brown et.al. (n.d.) report a Colorado mark-recapture study in which minimum home ranges for 3 males were estimated at 172, 190 and 210 ha (425, 469 and 519 acres or less than 1 sq. mi.) and 1 female at 86 ha (212 acres or .3 sq. mi.) and a Nebraska study which found the average size home range for males to be 17.3 sq. km. (6.7 sq. mi.) with a range between 6.7 - 28.8 sq. km (2.6-11.1 sq. mi.). Adult females averaged 12.4 sq. km. (4.8 sq. mi) with individuals ranging between 9.1 and 14.3 sq. km. (3.4-5.5 sq. mi.) Based on the averages of these studies a male might require a home range of approximately 3.4 square miles while a female might require approximately 2.5 square miles. Swift fox sign was found in greater or lesser densities in 15 of the generally 20 square miles of suitable habitat in the approximately 25 square miles of the combined study areas. Not all habitats appeared equally suitable for all activities with some areas having no activity at all while other appeared to support routine day use and with whelping dens showing the most restricted distribution. Nonetheless, within these general limits of average recorded home range requirements and acres of acceptable habitat at Pantex it would seem that several individuals representing more than one breeding pair are probably present.



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SPECIMEN RECORDS FOR THE TWO ARID FOXES OF TEXAS



Menard County, 1968, 1 male and 1 female V. velox specimen collected and housed at Texas Tech University Museum - This locality is nearer to the known range of the kit fox than swift fox, but according to the researcher's statement, the specimen was clearly assignable to the swift fox based on their small ears, short broad rostra, and relatively uninflated auditory bullae.

Crane, Crockett, Pecos Counties, 1968, 5 adult skulls of *V. velox* in private collection by professor at Austin College - Collected about 10 miles west of McCarney, at the point where Pecos, Crane, and Crockett Counties come together. These were from animals killed by hunters and hung on a fence. The skulls were on the ground and completely cleaned up. It is suspected that they were killed within 1.5 miles of this spot. Confidence in exact location of trapped individuals questionable, so confidence in record questionable.

Dallam County, 1986, 3 V. velox specimens collected and housed at West Texas State University Museum and Texas Tech University Museum - One of the most recent verifiable locations of swift fox specimens; one 16 miles west of Stratford (Whittenburg Ranch) in January (WTSU), one 21 miles North of Dalhart in April (TTU), and one 15 miles west of Stratford (Whittenburg Ranch) in December (WTSU).

★ **CARSON COUNTY:** Biologist reported lots of swift fox signs at Pantex Plant, July 1995.

★ **RANDALL COUNTY:** Refuge Manager at Buffalo Lake Wildlife Refuge reported seeing a fox (unverified) January 1994.

★ **DEAF SMITH** Biologist reported a roadkill
COUNTY: near Lake Garcia (unverified)
October 1994.

SWIFT FOX INVESTIGATIONS IN NEW MEXICO, 1995

C. GREORY SCHMITT, New Mexico Department of Game and Fish. P. O. Box 25112, Santa Fe, New Mexico 98504. (505-827-9925; fax 505-827-9956).

INTRODUCTION

The swift fox (*Vulpes velox*) was first reported in New Mexico from a skull taken at Cabra Spring, San Miguel County by W. B. Pease in March 1879 (Hubbard 1994). The second record of this species (specimen apparently unavailable) was taken near Clayton between 22 October 1893 to 2 February 1894 (Seton 1929). Only a few swift fox specimens were reported from New Mexico during the period between 1850-1950. Somewhat surprisingly, records of this species were not included in Bailey's (1931) work on mammals of New Mexico in spite of significant coverage of the state during 1989-1924 by the Biological Survey. Additionally, Ligon (1927) did not report this species in his accounts of a statewide survey of New Mexico. It appears possible that this species was formerly rare in the state, at least prior to 1950 (Hubbard 1994).

During the 1970s, published records (e.g., Packard and Bowers 1970, Best 1971, Aday and Gennaro 1973, and Findley et al. 1975) of this species accounted for 15 specimens that had been collected between 1952-1968 in Union, Curry, Roosevelt, Chaves and Lea counties (Hubbard 1994). Rohwer and Kilgore (1973) reported 13 swift fox records from Lea County of southeastern New Mexico, seven of which were new to the record at that time (Hubbard 1994). The 13 swift fox specimens reported by Dragoo et al. (1990) had been reported by previous workers. Hubbard (1994) located two additional specimens that apparently have not been reported in the literature, i. e., one each from Harding (ca 1967-68) and De Baca (1982) counties.

The occurrence of swift foxes in New Mexico has been confirmed by at least 25 specimens in museum collections or reported in the literature (Hubbard 1994). These are from 10 counties including Union, Harding, San Miguel, Guadalupe, Quay, De Baca, Curry, Roosevelt, Chaves, and Lea. This general area is part of what Dick-Peddie (1993) classifies as Plains-Mesa Grasslands. The area is also within the southern Great-Plains of New Mexico.

Swift foxes are classified as a protected furbearer in New Mexico and managed by the State Game Commission and New Mexico Department of Game and Fish (Department) under authority of Sections 17-5-1 through 17-5-9 NMSA 1978 (NMSA 1978 (1995 Repl.) 1995). Like other species of furbearers in New Mexico, trapping seasons on swift foxes are subject to periodic review and change of annual furbearer regulations (Appendix 1). 1996-97 furbearer seasons are open between 15 October 1996 to 15 March 1997. There are no bag limit restrictions on any species of furbearers in New Mexico. Hubbard (1994) concluded that during the period of 1980-81 through 1992-93, approximately 1,200 swift foxes were taken by sport trappers in portions of Colfax, Union, Harding, Quay, Curry, and Roosevelt counties. The annual harvest and projected trapping effort during the latter few years of this period has declined significantly.

There have been no biological investigations of swift foxes in New Mexico. The only synthesis of information on swift foxes in New Mexico was done by Hubbard (1994). Hubbard's status report on the swift fox in New Mexico consisted of a review of literature, examination of museum specimens taken in New Mexico, and an analysis of furbearer harvest surveys conducted by the Department.

Given the dearth of current, biological information on swift foxes in New Mexico, an overall goal to determine the status of swift foxes in New Mexico has been established. This goal has several objectives which include the following recommendations:

1. Continue to gather, analyze, and report on harvest of swift foxes. This should include kit foxes (*V. macrotis*) until taxonomic relationships between these two taxa are better understood.
2. Initiate investigations designed to aid in distributional and taxonomic studies on swift foxes. This will include research to determine methods for detecting and monitoring swift foxes (e.g., track plate surveys, spotlight surveys). Collection of specimens (to be preserved as museum specimens of skins, skeletons, and tissues) will also provide documentation needed in studies to determine the distribution and taxonomic status of this species.
3. Pursue additional investigations into the taxonomic status of swift foxes and kit foxes.
4. Investigate the biology of swift foxes to determine habitat requirements, populational characteristics, sources of mortality, threats, and prey.
5. Investigate the relationships among swift foxes, coyotes (*Canis latrans*), and red foxes (*V. vulpes*).
6. Conservation plans should be developed and implemented to properly conserve this species. This should include regulations and policies on trapping, predator control, and habitat protection commensurate with the status of swift foxes.

METHODS

Methods planned for 1996 to determine the distribution of swift foxes include use of tracking plate transects within areas of known swift fox range and collection of swift fox specimens. These activities will also include collection of kit foxes, with particular emphasis in the region where hybridization between these taxa is suspected.

RESULTS

There are no new data on swift foxes in New Mexico on which to report. However, contracts have been initiated for conducting track surveys. Total expenses for a contractor are estimated to be approximately \$1,500 (part of a \$5,943.50 grant to the Department administered by the National Biological Service [NBS]). The balance of this grant will be used to purchase equipment needed in tracking plate surveys and to pay for a portion of per diem expenses incurred by Department personnel. Two Department biologists will each spend approximately 31 days between March 1996 and April 1997 conducting surveys for swift foxes. This includes data analyses and preparation of a report on the findings of these investigations. Estimated Departmental expenses in addition to the NBS grant in tracking plate surveys will likely be three times the NBS grant.

Additionally, the Department will initiate activities to collect specimens of swift foxes throughout its known range in New Mexico as well as areas where they are expected to occur (e.g., Colfax, Mora, and Eddie counties). This will include areas where the ranges of swift foxes and kit foxes meet, an area where hybridization may occur (Rohwer and Kilgore 1973, Mercure et al. 1993). Limited collection of kit foxes in southwestern New Mexico will also be initiated. Collectively, these efforts will provide specimen documentation on the current distribution of swift foxes as well as fresh, full data specimen material (skins, skeletons, and tissues) useful in other studies.

Funding for swift fox investigations in New Mexico during 1996 will total approximately \$25,000 (\$5,943.50 from NBS grant and the balance from funds from Departmental budgets which are federal aid reimbursable Pittman-Robertson projects).

DISCUSSION

A review of literature, examination of Departmental documents on harvests of foxes, and discussions with persons knowledgeable on foxes in New Mexico reveals that virtually no data exist on swift foxes from which to substantiate their current distribution and status in New Mexico. Given the dearth of this type of information, it is essential to begin a systematic survey to gather distributional data on swift foxes in New Mexico.

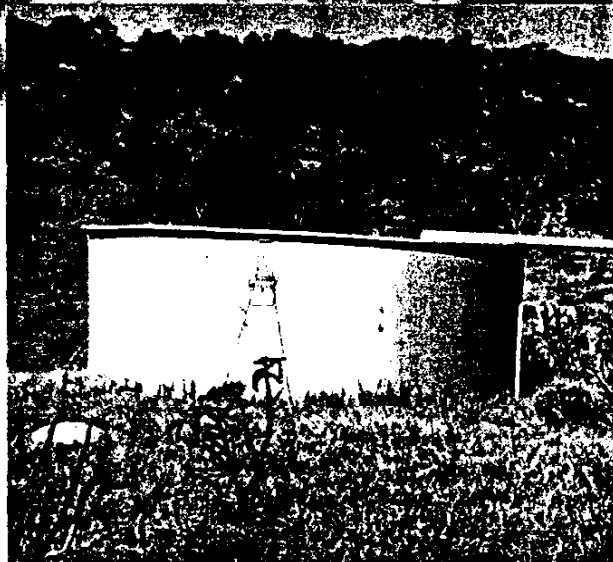
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HUNTING BIG GAME IN NEW MEXICO

**Proclamation of
1995-96 Seasons**



Habitat Stamp Program
(See pages 5 and 47)

Helping wildlife where it counts... where wildlife lives

FURBEARERS

SEASONS

Badger, weasel, fox, ringtail, bobcat, muskrat, beaver, and nutria: Oct. 15 - March 15, 1996, statewide.

Raccoon: Sept. 1, 1995-May 15, 1996, statewide.

There is no bag limit on any furbearer.

LICENSES REQUIRED

PROTECTED FURBEARERS: Residents age 12 or older and all nonresidents who hunt or trap protected furbearers, and all nonresidents who trap or otherwise take into possession coyotes or skunks, must have a **furbearers license**. (Furbearers are raccoon, badger, weasel, fox, ringtail, bobcat, muskrat, beaver, and nutria.)

UNPROTECTED FURBEARERS (coyotes, skunks): All nonresidents who take or attempt to take coyotes or skunks by use of traps, snares, or other devices designed to catch and hold the animal must have a nonresident furbearers license. However, nonresidents holding a nonresident nongame license or any current New Mexico hunting license may utilize firearms or bows to hunt for or kill coyotes or skunks, but may not take the coyote or skunk hide or carcasses into possession and may not set traps or snares. Residents of New Mexico need no license to take unprotected furbearers. There is no closed season or bag limit on these animals.

Resident licenses are available from Game and Fish offices and from license vendors statewide, or by mail (Form 3 on p. 44). Nonresidents should contact the Department of Game and Fish for licenses.

LEGAL MEANS OF TAKING

Furbearers may be taken by means of dogs, firearms, bow and arrows, and traps and snares. Calls, including mechanically or electrically recorded calling devices, are legal in hunting protected furbearers. **USE OF DOGS:** Dogs may be used in taking of protected furbearers only during open trapping season. There is no "pursuit" or "training" season outside the regular open season.

TRAP INSPECTION

A licensed trapper or his representative must make a visual inspection of each trap every 24 hours. If wildlife is held captive in the trap, the trapper or representative must remove the wildlife.

All traps must be personally checked by the trapper every 48 hours and all wildlife removed.

Each trapper will be allowed one representative who must possess written permission from the trapper. The permission must include the trapper's full name, address, furbearer license number, trap identification number, if appropriate, and general location or route of traps.

TRAP IDENTIFICATION

The following restrictions apply to the setting of any trap or snare that could reasonably be expected to catch a protected furbearer.

Each trap or snare used in the taking of wild animals must be permanently marked with either the user's name and address or a user-identification

number that is issued only from the Game and Fish Department's Santa Fe office (827-7885). The identification number or name and address must be stamped on the bottom of the frame or included on a metal tag riveted, welded, or otherwise securely attached to the trap frame, chain, or cable.

LAND SETS

(any trap or snare set on land)

No steel trap with an outside jaw spread larger than 6 1/2 inches and no tooth-jawed trap may be used in making a land set, except Conibear-type traps set on land for beaver. All leg-hold traps must be off-set at least 1/16th inch.

No land set may be placed within one-quarter (1/4) mile of an occupied dwelling without prior, written permission of the dwelling's occupant, except for a land set placed by a landowner on his own land.

No land set may be placed within one-quarter (1/4) mile of an established public campground, roadside rest area, picnic area, or boat-launching area.

No land set may be placed within 25 yards of any Forest Service or Bureau of Land Management system trail designated by the agency on a map provided for the general public, or within 25 yards of the shoulder of any public road that is graded and annually maintained with public funds.

No land set may be placed within 50 yards of any man-made livestock or wildlife watering, except on private land with written permission of the landowner.

WATER SETS

(any trap set fully or partially under water)

No steel trap with an outside jaw spread larger than 12 inches may be used in making a water set.

VISIBLE BAIT, TRAP FLAGS

It is illegal to place, set, or maintain any snare or steel trap within 25 feet of bait that is at all visible from any angle and that consists of the flesh, hide, fur, viscera, or feathers of any animal, provided, however, that a cubby set shall be legal when set where the bait can only be seen from a height of three feet or less above ground level and at a distance of 25 feet. Bait and trap must be placed within the natural or man-made cubby. Bones that are entirely free of flesh, hide, fur, viscera, or feathers may be used as visible bait. The restriction on visible bait shall not apply to a trap flag that is suspended at least three feet above the ground and that is made from materials other than parts of mammals, birds, fish, reptiles, or amphibians.

TAGGING BOBCATS

Anyone who takes a bobcat in New Mexico must present the pelt to a licensed fur dealer or at a Game and Fish Department office for tagging. The trapper or his agent must arrange for the pelts to be tagged within 30 days of capture. Anyone presenting a bobcat pelt for tagging must display a current trapper's license. Tags may be obtained from fur dealers or at Game and Fish Department offices. Department field officers do not have bobcat tags.

Agents shall be residents, registered with

CLOSED AREAS

ALL OF LOS ALAMOS COUNTY has been closed to all trapping, except the northern quarter of the county, and except a strip along the west bank of the Rio Grande, north of Water Canyon, from the Rio Grande to a line 1,000 feet below the Rio Grande canyon rim.

RIO GRANDE WILD RIVER, ORILLA VERDE, AND SANTA CRUZ LAKE RECREATIONAL AREAS: (descriptions, p. 9).

PUBLIC LAND WITHIN the exterior boundaries of any national forest, except public land within the Santa Fe and Carson national forests, is closed to beaver trapping.

VALLE VIDAL addition to Carson National Forest, **GREENWOOD AREA** of Vermejo Park, and **E.S. BARKER WILDLIFE AREA**, all in game management Unit 55.

STATE PARKS AND MONUMENTS, NATIONAL PARKS AND MONUMENTS, AND STATE AND NATIONAL WILDLIFE REFUGES.

MCGREGOR RANGE (Unit 28) is closed to trapping. Furbearer hunting may be allowed by permit and military permission (see McGregor Range, p. 8).

the department and only one per trapper. No fur dealers may act as an agent.

It is illegal to present for tagging the pelt of any bobcat taken outside New Mexico. No one shall transport across state lines, sell, barter, or otherwise dispose of any bobcat pelt taken in New Mexico unless it has been properly tagged.

LIVE FURBEARERS

IMPORTATION: It is illegal to import skunks, protected furbearers, or other wild-by-nature animals into New Mexico.

POSSESSION: It is illegal to possess or to retain alive in captivity any protected furbearer, except raccoon. Such raccoons must have been taken from within the state of New Mexico, and may be held only under special permit issued by the Department of Game and Fish.

Possession of protected furbearers as pets (except raccoons taken from within the state) or for such purposes as fur farming, scent production, breeding, etc., is prohibited.

Contact the Department of Game and Fish for raccoon retention permits.

OTHER SPECIES

If you happen to trap a legally protected game mammal or game bird, or trap a protected furbearer during closed season, you must release it. If, however, it is badly injured, or its release would be dangerous to accomplish, you must advise the Department of Game and Fish as promptly as possible. The department will release the animal and, if necessary, treat its injuries.

NOTE: There are no open trapping seasons on bear or cougar. Livestock owners, or others suffering depredation from bear or cougar, should contact the Department of Game and Fish for assistance and advice.

DISTRIBUTION AND ECOLOGY OF SWIFT FOX IN OKLAHOMA

JULIANNE WHITAKER HOAGLAND, Oklahoma Department of Wildlife Conservation, 1801 N. Lincoln Blvd., Oklahoma City, OK 73105. (405-522-0189; FAX 405-522-4372)

ABSTRACT

Tracking stations, spotlighting and predator calling were used to detect swift fox presence in the three counties (Cimarron, Texas and Beaver) comprising the Oklahoma panhandle. Tracking stations with scent lures were used in Cimarron County in July 1995, and resulted in 1 swift fox visit per 100 stations set. Rain, however, rendered most of the stations inoperable. Ten of 86 operable tracking stations, with food baits, yielded swift fox visits throughout all three panhandle counties in October 1995. Spotlighting and predator calling surveys were conducted opportunistically and did not yield any swift fox sightings. Although spotlighting and predator calling will continue to be conducted during 1996 sampling periods, tracking stations will be emphasized as the principal method of swift fox detection.

INTRODUCTION

The swift fox was considered to occur historically throughout the Oklahoma panhandle (Cimarron, Texas and Beaver counties) and in three northwestern counties (Harper, Woodward and Ellis)(Caire et al. 1989). The first records of swift fox occurrence in Oklahoma were made in 1888, from the Neutral Strip, Indian Territory (Caire et al.1989). Duck and Fletcher (1945) considered the swift fox to inhabit the panhandle and western counties, but that the species was rare and seldom seen or trapped. They noted, however, that in earlier years, swift foxes were frequently seen throughout the area. Swift foxes have been observed in Texas and Beaver counties throughout the 1950s and 1960s by several researchers (Cutter 1959, Glass 1959, Kilgore 1969). Kilgore (1969) considered the swift fox abundant in the panhandle and observed an increase in the number of swift foxes in Beaver County. Seventeen swift fox were killed within a mile of the town of Guymon, in Texas County in the spring of 1965 (Caire et al. 1989).

The swift fox is classified as a furbearer species in Oklahoma with a year-round closed taking season. The swift fox is also a species of special concern in Oklahoma. A comprehensive survey has not been conducted for swift fox in the state and little effort has been undertaken to clarify the status of the species in the state since Kilgore's (1969) study. In recent years the species has been reported from four counties in the panhandle and northwestern portions of Oklahoma. A 1988 landowner survey by the Oklahoma Department of Wildlife Conservation (ODWC) yielded 21 individual swift fox sightings and eight den locations in the panhandle. Additionally, swift fox have visited scent stations on the Packsaddle Wildlife Management Area in southern Ellis County during between 1991 and 1995. The majority of these reports, however, cannot be verified. The swift fox does appear to occur at low density. A copy of state regulations regarding the swift fox is attached as Appendix A.

The five objectives of this study were: 1) to determine the distribution of the swift fox throughout the Oklahoma panhandle, to identify areas of high and low populations, and to accurately determine the range of the swift fox population within the state; 2) to evaluate the effectiveness of different techniques used to sample carnivore populations; 3) to investigate habitat affinities and potential interspecific associations (e.g., with other canids) of the swift fox; 4) to evaluate the swift fox's dependence on particular landscape features; and 5) to assess potential threats to existing swift fox populations.

STUDY AREA AND METHODS

The three counties in the Oklahoma panhandle (Cimarron, Texas and Beaver) were surveyed for the presence of swift fox and other canids. Presence and limited distribution were determined primarily through the use of baited tracking plates at pre-established tracking stations. Steel tracking plates, composed of 1m x 1m 26 gauge stainless steel, were sprayed with a mixture of isopropyl alcohol and carpenters chalk (G.M. Fellers, pers. comm.). The alcohol served as a dispersant and the mixture resulted in a thick, uniform coating of chalk on the plate after the alcohol evaporated. Attractants were then placed at stations and the plates were recovered and checked for tracks after three nights.

Originally, 100 scent stations were established in Cimarron County and were conducted in July 1995. In October 1995, 90 permanent tracking stations were established throughout the three panhandle counties according to county size and the proportionality among varying habitat types. Cimarron County contained 31 tracking stations, Texas County had 33 tracking stations, and 26 tracking stations were established in Beaver County. Five broad habitat types identified in the Oklahoma panhandle were; rangeland, mesa, agricultural cropland, riparian areas, and prairie dog towns. The dominant gross habitat feature in the panhandle is rangeland, which had 36 tracking stations placed in this habitat type. Eighteen tracking stations were established on agricultural cropland, 16 tracking stations were placed in prairie dog towns, 14 tracking stations were placed in riparian areas, and 12 tracking stations were established in the Black Mesa area.

Several different baits and lures were tested as attractants before the first complete sampling period was initiated. Canid fatty acid scent disks obtained from the Pocatello Government Supply Depot were tested first. The disks were placed on top of the centrally located permanent stakes that marked the positions of the tracking stations. The second attractant tested was a combination of food baits. Canned mackerel was combined with beef scraps obtained from a butcher. The mackerel was placed in the center of the tracking plates while a scrap of beef was placed on top of each marking stake. The effectiveness of these two different attractants was then compared.

Nighttime spotlighting was also conducted to determine swift fox presence. Three spotlighting techniques were evaluated for effectiveness. The first technique consisted of spotlighting over an established number of miles driven per night. No stops were made and the vehicle speed was kept under 20 mph. The second and third techniques included predator calling in order to draw canids into the range of the spotlight. Ten sites, each consisting of five miles of continuous road, were preselected in each county. In the second technique, five of the ten sites had predator calling conducted for 15 minutes at the beginning of each mile along the established route. In the third technique, the remaining five sites had predator calling conducted for 15 minutes only at the beginning of the five-mile transect.

A third technique used to detect swift fox presence was the use of infrared cameras at selected tracking stations. The cameras were set up within 15 feet of the tracking plate, facing the station, allowing for verification of the any endotherm visiting the tracking station.

A limited amount of snow tracking was conducted as a fourth and final swift fox detection method. During the winter months, periods of snow accumulation in the panhandle region allowed for opportunistic distributional surveys. While snow was on the ground, the permanent tracking stations were visited and area around the stations was examined for canid tracks. It is possible that canids will use the stakes marking the permanent station locations as scent stations. Fresh snowfall was likely to initiate remarking of home ranges and the area was examined for any sign of scent marking.

RESULTS

Tracking plates were placed at 100 stations between 19 and 25 July 1995 in Cimarron County only. During this period, the fatty acids scent disks were used as the attractant. Continuous rain interrupted the sampling period and obscured many of the tracking plates. The rain did allow, however, for tracking to be conducted in the substrate around the tracking stations and along the roadsides. One swift fox visit was detected on the tracking plates during this initial sampling period in southeastern Cimarron County on the range habitat type. In addition to the tracking plates, three other swift fox were detected by roadside tracks also in southwestern Cimarron County on the Rita Blanca National Grassland.

The second sampling period was conducted between 13 and 20 October 1995. The number of permanent stations was reduced from 100 per county to 90 across all three panhandle counties. Eighty-four tracking stations were actually operated during this sampling interval. Six stations, located in the southwest corner of Cimarron County, could not be established due to equipment problems. During this sampling period, canned mackerel and beef scraps were used as bait/attractants. Ten sets of swift fox tracks were detected in all three counties and in four different habitat types; range, mesa, riparian, and cropland. Cimarron County had the highest abundance of swift fox visits to the tracking stations (seven), followed by Beaver County with two visits and Texas County with one tracking station exhibiting swift fox tracks. Along with swift fox, eight coyote, one red fox, one bobcat, three badgers, one raccoon and three striped skunks were also detected on the tracking plates during the October survey period.

Spotlighting was conducted opportunistically during both the July and October sampling period only in the mesa habitat of Cimarron County. All three methods were attempted. No swift fox were seen during spotlighting efforts with or without the predator calling component. Coyote and bobcat were seen during spotlighting efforts but only when predator calling was employed as part of the methods. One swift fox was seen while driving at night past the entrance of Black Mesa State Park (October 15, 1995), but this was not in conjunction with the spotlighting survey.

Infrared-triggered cameras were used during the October sampling period at five tracking stations across the three panhandle counties in a preliminary evaluation of their effectiveness. Three of the tracking stations recorded carnivore tracks, and the cameras indicated that they had been triggered but the film has not yet been developed.

Snow tracking was conducted in February and March 1995 on a limited scale during initial orientation trips to the field sites. While the methods proved sound, no tracks were discovered. Snow tracking is expected to continue through 1996.

Funding for this project was provided through Section 6 funds. The ODWC submitted a swift fox survey proposal to the U.S. Fish and Wildlife Service in December of 1993, and received funding for the study in April of 1994. The swift fox survey project was initiated in September of 1994. The ODWC received \$12,000 for the first year, and \$13,000 for the second year, of the proposed three-year project. The results represent effort from 1 October 1994 through 31 October 1995. ODWC has submitted a proposal for an additional \$13,000 for the third year of the project.

The study was contracted to the Oklahoma Natural Heritage Inventory at the University of Oklahoma. The project investigators have been Dr. Mark Lomolino and graduate assistant Mike Shaughnessy.

DISCUSSION

The strongest technique used to assess swift fox presence and distribution in the Oklahoma panhandle has been the tracking station. In dry weather, tracking stations provided clear, easily read tracks. Additionally, the tracking stations were not restricted to just swift foxes. Several stations recorded both swift fox as well as the tracks of other carnivores. The ability to record multiple species at a station made the tracking plates an effective technique. Tracking stations will be continued and emphasized as the principal method of swift fox detection.

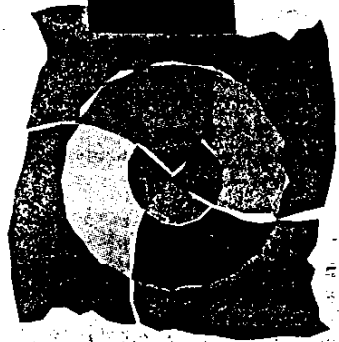
Evaluation of baits and lures as attractants at the tracking stations was not entirely objective, as the scent disk trial was greatly ineffective due to rain. After consulting with other swift fox researchers and evaluating the results from the sample using canned mackerel and beef scraps, it appears that the food baits were more effective at bringing swift fox to the tracking plates than scent lures. Aside from offering this opportunistic canid a "reward" for visiting the station, the food baits did not emit any other canid odors. Scent lures, like fatty acid scent disks, may actually discourage swift fox from visiting tracking stations because the swift fox may associate these odors to the presence of coyotes or other canid species in the area. Therefore, future tracking stations will use only the food baits of canned mackerel and beef scraps as attractants.

The spotlighting techniques were not as effective as the tracking plates in detecting swift fox presence in an area. It does appear, however, that predator calling was essential during spotlighting operations in attracting normally shy carnivores into the spotlight range. The call itself was reported to carry over a mile in range. The technique can be reasonably expected to yield accurate data on carnivore presence and relative abundance in a selected area. It is not clear, however, as to why the technique has not worked well for swift fox in Oklahoma. Due to these ambiguities, the spotlighting component will continue, being conducted during tracking sessions in order to more accurately assess the technique before determining whether to eliminate the technique from the study.

The infrared-triggered cameras and snow tracking have not been used enough to be critically evaluated at this time. These methods will continue through 1996 in order to assess their usefulness to the project.

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OKLAHOMA

Hunting Regulations



1 9 9 5 1 9 9 6

Effective Dates: May 7, 1995 to May 6, 1996

Page 1

Regulations Questions??? Call the Oklahoma City office at 405/521-2739 or your local game warden

FURBEARING SEASON

Note: Seasons on public lands may vary from statewide seasons. Consult pages 14-16 for specific area regulations.

LICENSE REQUIREMENTS:

Resident: Annual hunting or combination license, lifetime hunting or lifetime combination license, senior citizen hunting or senior citizen combination license or proof of exemption (see exemptions 1B). In addition to a hunting license, a trapping license is required for all persons who trap a furbearer unless exempt (see exemptions 1B). Such license shall expire on January 31 of each year. Therefore, a 1996-97 trapping license must be purchased to trap beaver, nutria, striped skunk, and coyote after January 31, 1996.

A special bobcat-raccoon-gray fox license is required for all who take these species by any means unless exempt. Such license is valid December 1, 1995 through January 31, 1996.

Lifetime hunting or combination license holders must purchase a trapping license to trap.

Nonresident: Nonresident fur harvesters must possess a nonresident annual hunting license. In addition to a hunting license, a nonresident (professional) trapping license is required for all persons who trap any furbearer. Such license shall expire on January 31 of each year. Therefore, a 1996-97 trapping license must be purchased to trap beaver, nutria, striped skunk, and coyote after January 31, 1996.

A special nonresident bobcat-raccoon-gray fox license is required for all who take these species by any means. Such license is valid December 1, 1995, through January 31, 1996.

BOBCAT, RACCOON, BADGER, MINK, MUSKIE, POPOSSUM, WEASEL

Open December 1, 1995 through January 31, 1996, statewide.

BEAVER, NUTRIA, STRIPED SKUNK, AND COYOTE

Open year-round; statewide, except as provided below.

GRAY FOX

Open December 1, 1995 through January 31, 1996 east of Interstate Highway 35. Closed year-round west of Interstate Highway 35.

COYOTE

It shall be unlawful to hunt, take or attempt to take coyotes within the period of dark to daylight with the aid of any artificial light and any sight dog.

Any person may use a shotgun, using No. 6 size shot or smaller, bow and arrow, light and a call for the purpose of hunting coyotes only, provided that written permission is obtained from the local Game Warden for each twenty-four hour period of hunting.

Black Bear, Mountain Lion, Red Fox, River Otter, Swift Fox, Spotted Skunk and Ringtail: Closed year-round, statewide.

BAG LIMITS

	Daily Limit	Season Limit	Possession Limit
Bobcat	2	8	8 per licensee
Raccoon	6	30	30 per licensee
Gray Fox	2	6	6 per licensee

For other species taken legally, there is no limit.

BOBCAT TAGGING REQUIREMENTS

No bobcat pelt may be held in possession after 10 working days after the close of furbearer season by the taker or buyer, sold, purchased or bartered within Oklahoma, nor taken out of Oklahoma, without having first affixed a permanent tag to the pelt, and no one may possess any Oklahoma bobcat pelt without a permanent tag affixed to the pelt. This tag shall serve as an export tag. The tag must be affixed by an authorized employee of the Oklahoma Department of Wildlife Conservation or designated tagging agent. It is the responsibility of the possessor of the bobcat pelt, not the Department, to ensure that the pelt is legally tagged. No untagged bobcat harvested in another state may be possessed in Oklahoma.

Tags are available from any Oklahoma Game Warden or Game Biologist and from state fish hatcheries and Department field offices and specially designated tagging stations. 1995-96 bobcat export tags will not be affixed after February 14, 1996.

GENERAL REGULATIONS

SALE OF CARCASS: Carcasses or parts of legally acquired furbearing animals may be purchased, bartered, traded, sold or offered for sale.

SALE OF FURS: Persons taking pelts during the season shall have until ten (10) working days after the close of said season to sell or dispose of such pelts.

POSSESSION OF CARCASSES OR HIDES: It shall be illegal to possess live animals, carcasses or raw furs of red fox, ringtail, spotted skunk, swift fox, river otter, mountain lion or bear unless it can be proven that each carcass or hide was taken legally outside of Oklahoma. Proof of legality or origin for carcasses or green hides shall be a tag or other marking or device attached to it or imprinted on each and every hide in such a way that it cannot be removed intact. The tag or marking must be the official method used by the issuing agency. If an identification is not required by the issuing agency, a hunting or trapping license appropriate to the species taken is required as proof.

LEGAL MEANS OF TAKING: FIREARMS OR BOWS AND ARROWS - Daylight only: Any legal firearm or bow and arrow. Nighttime only: A person may possess a .22 caliber rimfire rifle or .22 caliber rimfire pistol and a light carried on the person while in pursuit of furbearers with hounds during the legal, open furbearer season, while possessing a valid hunting license.

TRAPS: Box traps; smoothjawed, single-spring, leg-hold steel trap with a jaw spread no greater than eight inches; smooth-jawed, double-spring offset jawed, leg-hold steel traps with a jaw spread no greater than eight inches.

SETTING OF TRAPS: No trap may be set "in the open" or in paths, roads or runways commonly used by persons, dogs or other domestic animals.

VISITATION OF TRAPS: Traps must be tended once each 24-hour period.

LEGAL NUMBER OF TRAPS: Persons trapping under the general trapping license may use no more than 20 traps. There is no limit for persons holding the professional license.

IDENTIFICATION: All traps must bear the owner's name identification attached thereto, except for any person trapping on his own property. All traps on Department-managed lands, regardless of species being sought, must bear the owner's name attached thereto.

POSTING OF TRAPS: When double-spring offset jawed steel traps are used, signs must be posted conspicuously to the right and left of all entrances from public roads and highways and from adjacent lands at corners of perimeter fences. Signs must have minimum dimensions of 5" by 8" and the wording "Traps" must be included and be conspicuous on the signs and printed in letters at least 1/2" tall. Persons trapping on their own property are not subject to this requirement.

PERMISSION TO TRAP: No person may trap on the inhabited land of another without first obtaining from the owner or occupant thereof a written permit to do so. This permit must be carried whenever traps are being tended. Said permission is also required to hunt but it need not be in writing.

EXEMPTIONS FROM REGULATIONS: Nothing in this regulation shall prevent the killing of furbearers found destroying livestock or poultry.

Nothing in this regulation shall prevent the running or chasing of bobcat, fox or raccoon with dogs for sport only, except on those public lands where such activity is prohibited.

SWIFT FOX (*Vulpes velox*) MANAGEMENT AND RESEARCH IN KANSAS: 1995 ANNUAL REPORT

LLOYD B. FOX and CHRISTIANE C. ROY. 1995. Kansas Department of Wildlife and Parks, Research and Survey Office, 1830 Merchant, Box 1525, Emporia, KS 66801. (316-342-0658; fax 316-342-6248; e-mail uskanf7y@ibmmail.com)

ABSTRACT

Swift fox populations in Kansas have greatly fluctuated since pre-settlement. Swift fox are now present in most of their historical range and have maintained a stable population for the past 20 years. Several methods are currently used to determine the status of the population. Road side surveys, employee opinion survey, furharvester survey, mandatory swift fox pelt tagging records, and more recently, spotlight surveys and track plate surveys. Research projects on differential survival rates between swift fox inhabiting rangeland and cropland habitats, mortality causes, home range, and den site characteristics are being conducted. Our preliminary findings suggest dryland wheat farming, and moderate to intense grazing pressure, may be compatible with swift fox management. Coyote predation was found to be the most important cause of mortality in swift fox. The change of native prairie to CRP cover has reduced suitable habitat for swift fox and potentially lowered swift fox abundance due to higher coyote predation.

INTRODUCTION

Based on reports of settlers it appears swift fox occurred in 36 counties in Kansas at the time of settlement (Fig. 1)(Carter 1939). In the late 1800 and early 1900, swift fox numbers were declining and several authors thought the species was becoming increasingly rare (Knox 1875, Baker 1889, Lantz 1905). By the 1930's the situation had deteriorated even further to the point where it was believed the species had been extirpated from Kansas (Black 1937, Cockrum 1952). It was not before the early 50's that the swift fox started its slow but steady comeback, and specimens were being collected (Martin and Sternberg 1955, Hibbard and Taylor 1960, Anderson and Fleharty 1964, Janes and Gier 1966, Walker 1987). By 1980 the population was recovering. Boggess and Johnson (1981) considered the swift fox population in Kansas to be stable and even expanding through much of the historical range. Their reports indicated that 100-400 swift fox were accidentally taken each year in traps set for coyotes. During the 1982-83 season, Zumbaugh and Choate (1985) collected 215 specimens from 12 different counties and concluded the swift fox had reoccupied much of its original range in Kansas. Since then the distribution has remained relatively stable with little expansion eastward (Fig. 1).

Several factors are probably responsible for the decline of the swift fox in North America. Perhaps the most important was the inadvertent poisoning from strychnine aimed at controlling coyotes (*Canis latrans*) and wolves (*Canis lupus*). Swift fox died by the thousands from eating strychnine laced bait (Young 1944). Intensive trapping in the late 1800's also may have played an important role in the decline of the swift fox (Rand 1948). Destruction of native prairie habitat, prairie dog (*Cynomys* spp.) control programs, and the disappearance of bison (*Bison bison*) and wolves are all thought to have played a role in the decline of the species (Carbyn and Killaby 1989, Sharp 1989, Herrero et al. 1990). Improved coyote control practices resulted in a drastic reduction in the number of accidental swift fox mortalities.

SWIFT FOX MANAGEMENT IN KANSAS

Swift fox were unprotected in Kansas until 1931 when red fox, grey fox and swift fox were added to the furbearer list. The season was then closed on swift fox harvest in 1956 and it was not until the 1982-83 season that the swift fox could be legally harvested again. No limits were set on the number of animals harvested, but harvest was restricted to furbearer harvest season. The opening of a swift fox harvest season in 1982-83 provided the opportunity to acquire harvest information on the swift fox. With the help of department employees, swift fox population trends could be closely monitored. In 1983, a survey of Kansas Department of Wildlife and Parks (KDWP) employee opinion on the status of furbearer populations in Kansas was initiated. The 10 week raccoon roadside survey, initiated in 1980, was expended in 1986 to include swift fox and other furbearers. Locations and number of swift fox sighted, or killed due to motor vehicle accidents, have been recorded since. Harvest estimates, based on our annual furbearer harvest survey, has varied from 48 to a record high of 1,200 swift fox during the 1986-87 season (Fig. 2). Based on the annual employee opinion survey, the swift fox population has remained stable. The roadside survey showed an all time high of 26 swift fox observations in 1994 (Fig. 3). In 1994, the KDWP adopted a swift fox pelt tagging program aimed at acquiring information on the number of animals harvested, the distribution of swift fox in Kansas, locations of harvest, and types of habitat utilized by swift fox. Pelt tagging also provides the opportunity to acquire skinned carcasses from furharvesters and collect important biological information on the species. Because the majority of swift fox captured in Kansas are incidental to coyote trapping, an information package was mailed to furharvesters in fall of 1995 to inform them of the effectiveness of pan tension devices to avoid accidental captures of swift fox. All furharvesters within swift fox distribution and known swift fox furharvesters were mailed copies of a short document informing them of current research findings on pan tension device effectiveness (Turkowski et al. 1984, Phillips 1995).

A preliminary study on five survey methods used to detect the presence of swift foxes was conducted in October 1995. Survey methods included: spotlight surveys, systematic track search (Sargeant et al. 1993), track plates (Tim Woolley, Wyoming Game and Fish Dept., pers. comm.), road kill, and a 3x4 square mile trapping grid (Jim Fitzgerald, Univ. of Northern Colorado pers. comm.). Results suggested that track plates and spotlight surveys were the most cost and time effective survey methods to detect the presence of swift fox. The type of soil substrate and high winds did not lend themselves well to systematic track search at the time, but would be most efficient in winter and spring. Trapping required a considerable amount of time to acquire landowner permission and had a very low to null outcome in areas of low swift fox abundance (Table 1). Trapping is essential though when animals require marking or to confirm the presence of swift fox at specific locations. To complete the current assessment of swift fox distribution in Kansas, KDWP District Biologists have been conducting spotlight surveys and running track plate surveys in known historical swift fox range where no harvest or confirmed sightings were recorded.

Funding for swift fox in Kansas is primarily received by federal aid to fish and wildlife management (Pittman-Robertson Act) and state agency funding. We are also grateful to the Western Resource company for their donations of track plates (\$400). Since 1992, an average of \$20,000 is spent annually on swift fox management and research.

RESEARCH PROJECTS

A comparative study of swift fox survival rates between rangeland and cropland areas has been ongoing since 1993. Ray Matlock, a graduate student from Kansas State University, KS, has been working on the project for the past two years and will present his final report in April 1996. Research on swift fox den characteristics and habitat selection was initiated in 1995 by Vicky Jackson, a graduate student from Hays State University, KS. Her final report will be presented in December 1996.

Study site and methodology

Two study sites of approximately 35 km² were selected to conduct both research projects. The two adjacent sites are located in Wallace and Sherman counties, Kansas. The north site is dominated by cropland (cropland site), whereas the south site is predominantly short grass prairie with moderate to high grazing pressure (rangeland site). In the summer of 1993, 19 swift fox were captured 31 times in 796 trap nights (3.9% success) of effort on the rangeland site. Sixteen swift fox, including 10 adult males and 6 adult females, were fitted with radio transmitters. In the cropland site, 18 swift fox were captured 25 times in 570 trap nights of effort (4.4% success). Five adult males and 7 adult females were fitted with radio-transmitters. In 1994 swift fox were trapped from June to August. During that time interval, 90 swift fox were captured in 1564 trap nights of effort (5.75% success). Fifteen foxes were outfitted with radio-transmitters in the rangeland site and 16 in the cropland site. In 1995 trapping began in March and continued through October. For the first three months, 29 swift fox were captured in 336 trap nights of effort (8.6% success). Of the 20 foxes fitted with radio-transmitters, 10 already had transmitters and received new ones. Swift fox were radio-tracked once a month to determine survival rates and cause of mortality. In the summer of 1995, den site characteristics were evaluated by radio-tracking swift fox to their dens, or locating non-collared swift fox in early mornings and late afternoons at their natal den sites. The various parameters measured at each den site include: number and width of den entrances, distance between entrances, dimensions of mounds, type and density of soil, distance to nearest man-made structure, and type, density, and height of vegetation.

Preliminary results

In 1993 pre-dispersal density was estimated at 50 swift fox/100 km². This does not include additional unmarked swift fox which were observed at both study sites. Density estimates for 1994-95 is not available. Staggered entry survival rates (Pollock et al. 1989) for the period from mid August to late February 1994 were estimated to be 0.611 at the cropland site and 0.3646 at the rangeland site. Mortality was primarily due to coyote predation. In the rangeland site, 8 swift fox were killed by coyotes, 1 died of unknown causes, 1 was killed by a vehicle, and radio contact with 1 swift fox was lost. In the cropland site, 4 foxes were killed by coyotes, and one by a vehicle. Two of the coyote kills in the cropland site actually occurred in short grass prairie. Tall dense vegetation and rough terrain appear to contribute to swift fox vulnerability. Swift fox dens were located in shortgrass prairie, fallow cropland, wheat, sunflower, and irrigated crop fields. No dens were located in CRP fields. Den site characteristics results are not presently available.

DISCUSSION

While a few studies (Kilgore 1969, Hines 1980, Fitzgerald et al. 1983) have indicated swift fox inhabit areas with a mixture of agricultural use, no study has addressed the impact of agricultural practices and grazing on swift fox. It is generally believed swift fox require shortgrass or mixed grass prairies (Samuel and Nelson 1982) and swift fox populations in agricultural lands occur at lower densities than in prairie. Furthermore, conversion of prairies to cropland has been implicated as an important factor in the decline of swift fox populations or their failure to recover (Cutter 1958, Kilgore 1969, Snow 1973, Hillman and Sharps 1978, Hines 1980, Fitzgerald et al. 1983). Based on the tendency for similar San Joaquin kit fox (*Vulpes macrotis mutica*) to exploit areas substantially modified (FaunaWest Wildlife Consultants 1991), we suggest it is not necessarily the conversion of prairie to cropland which hinders swift fox recovery, but rather the management of the grasslands and the cropping patterns on the croplands, and how these practices influence potential prey and coyote populations. Tall dense grassland, such as occur on CRP fields, may be unsuited as swift fox habitat. These areas provide increased prey and escape cover for coyotes, and thus further tip the habitat scale away from swift fox. Coyote populations may also be a key to current swift fox abundance and distribution. Until the use of radio telemetry it was frequently stated coyote predation was a natural mortality (Kilgore 1969), however, it was generally de-emphasized by stating there was little evidence of predation (FaunaWest Wildlife Consultants 1991). Our research and other recent telemetry studies (Rongstad et al. 1989, Covell 1992, Brechtel et al. 1993) have shown predation by coyotes is the most important mortality factor.

Agricultural systems on privately owned lands are crucial to swift fox conservation. For example, most Federal and State owned lands in Kansas are either too small or inadequate to support swift fox, or outside the historic distribution of the species. Management by private landowners during the previous 40 years has been sufficient to allow swift fox to survive and indirectly prosper from man's agricultural activities. Quantitative data are needed on the impact of grazing on swift fox habitat before management recommendations are formulated. Snow (1973) suggested control of grazing was a critical consideration in swift fox management. Quantitative data may show intensive grazing is necessary to reduce visual obstructions. Cutter (1958) reported nearly 75% of the swift fox dens in his study occurred in areas he classified as overgrazed pastures. In western Kansas, dens are commonly found in both cropland and rangeland. Our preliminary findings suggest dryland wheat farming, and moderate to intense grazing pressure, may be compatible with swift fox management.

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Table 1. Summary of survey methods used to detect the presence of swift fox and other furbearers in western Kansas

Spotlight survey

County	Swift fox	Coyote	Raccoon	Skunk	Badger	Miles	Time (hrs)
Hamilton	4	2	2	1	4	119	6:45
Morton-Stanton	2	5	1	1	0	181	7:00
Seward	0	0	0	1	0	29	1:00
Stevens	0	1	0	1	0	35	2:30

Track plate survey - 60 plate nights

County	Swift fox	Coyote	Raccoon	Skunk	House cat	Time (hrs) (3 days)
Hamilton	10	3		2	1	6
Morton-Stanton	1			5		6

1/4 mile track search

County	Swift fox	Coyote	Raccoon	Skunk	Badger	# 1/4 mile sections surveyed	Time
Hamilton	3	7	1	2	2	10 miles (40 1/4 mile)	13:20
Morton - Stanton	2?	4		1?		2.5 miles (10 1/4 mile)	3:20

Trapping and tracks around traps

County	Swift fox	Coyote	Raccoon	Skunk	Badger	Time (hrs)
Hamilton	2 captured 6 tracks	8 tracks	3 tracks	1 tracks		6
Morton	2 tracks	11 tracks		1 captured 2 tracks		6

Overall success rate (%) and effort (hrs) between each survey method

County	Spotlight (x /100 miles)	Track Plates (x / 100 plates)	Trapping (x / 100 trap nights)	Track Search (x tracks / x searched)
Hamilton	3.4 % - 7 hrs (0.49%/hr)	16.6 % - 6hrs (2.76%/hr)	3.3%- 6hrs (0.55%/hr)	15.8 % - 13hrs (1.19%/hr)
Morton-Stanton	1.1% -7hrs (0.16%/hr)	1.7 % - 6hrs (0.28%/hr)	0 %	not sure of track id.

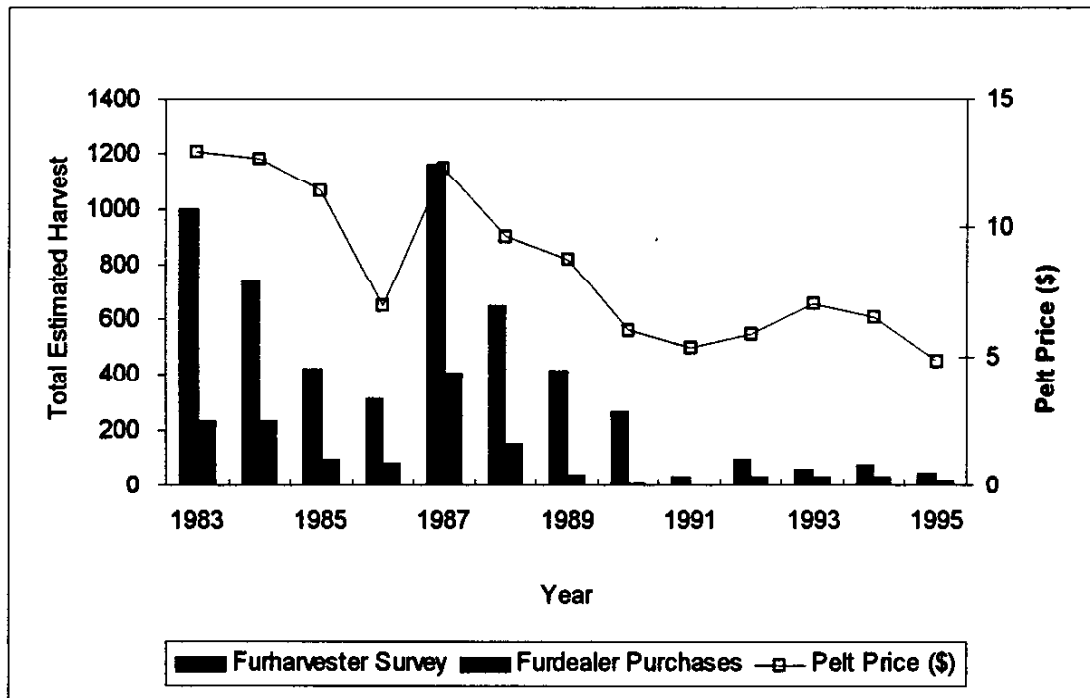


Figure 2. 1983-1995 swift fox harvest, purchases, and pelt price in Kansas

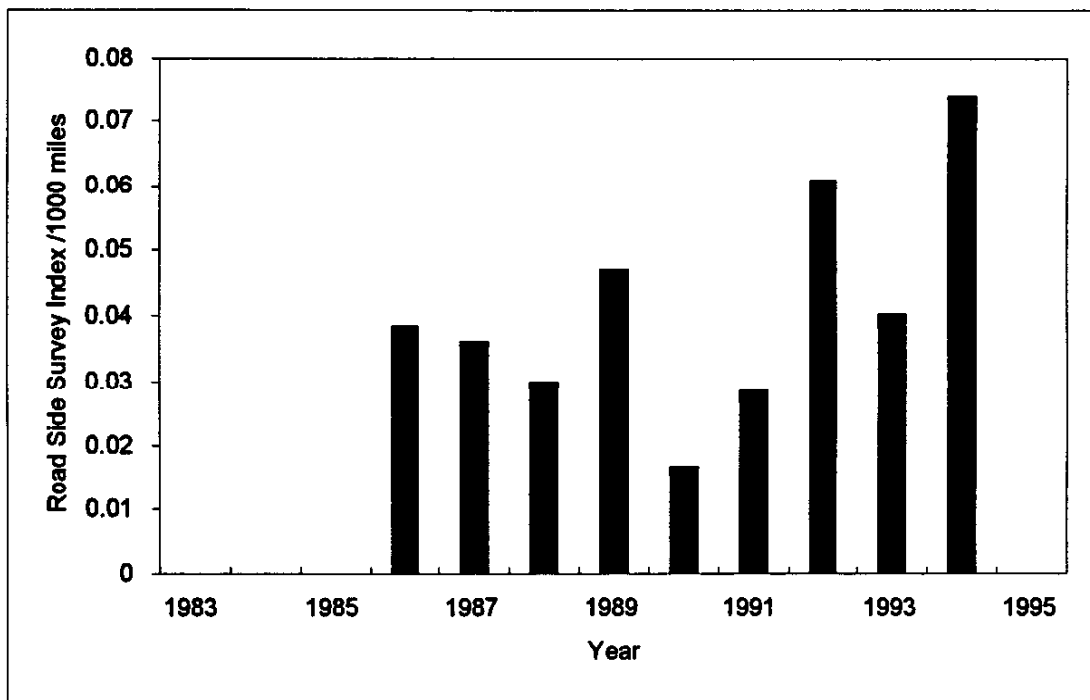


Figure 3. Annual summer road side survey of furbearers in Kansas



KANSAS HUNTING & FURHARVESTING REGULATIONS SUMMARY

1995-96

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GENERAL INFORMATION

HUNTING LICENSES

All Kansas hunters age 16 to 65 must have a resident hunting license. All non-resident hunters, regardless of age, must purchase a non-resident hunting license.

Any person who has not been a legal resident of the state for 60 days is considered a non-resident. Proof that you are a legal Kansas resident includes voter registration cards, income tax receipts, or driver's licenses. Lifetime license holders are considered Kansas residents in regard to all hunting permits and tags, even if they no longer live in Kansas.

Military personnel hunting or furharvesting while on leave or furlough **ARE** required to have hunting or furharvesting licenses, even if they joined the service while residents of Kansas. Non-resident military personnel not stationed in Kansas must have a non-resident license. Those who were Kansas residents immediately prior to enlistment may purchase a resident license.

Non-residents may purchase a special license that is valid only while hunting on controlled shooting areas.

FURHARVESTER LICENSE

A furharvester license is required to hunt, trap, or pursue (run) furbearers, or to sell their pelts. A furharvester license is required to trap coyotes, and a hunting license is required to hunt them. The same license required to take coyotes is required to sell their pelts.

Up to two unlicensed, non-participating observers may accompany a licensed furharvester, but only to observe dogs with intent to purchase them.

Persons under 16 years of age may purchase a furharvester license at half price. Persons under 14 years of age who are accompanying a licensed furharvester are not required to purchase the license.

LICENSE EXEMPTIONS

Kansas hunting and/or furharvesting licenses are not required for the following:

- 1) owners of land or tenants of land leased or rented for agriculture, and their immediate families living with them, while hunting or furharvesting on this land;
- 2) legally-defined Native Americans (must apply for free licenses);
- 3) active-duty military personnel stationed in Kansas may hunt or furharvest with a resident hunting or furharvesting license, if they carry evidence identifying them as active-duty military personnel;
- 4) nonresidents who are full-time secondary, post-secondary or vocational school students in Kansas may obtain resident hunting licenses but must carry evidence of their status as a Kansas student; and
- 5) non-residents using field trial permits issued by Wildlife and Parks.

HANDICAPPED

Persons certified by a physician as having a permanent disability may be eligible for special permits allowing them to hunt from a vehicle or hunt deer with a crossbow. For more information on these permits, contact the Department of Wildlife and Parks, Law Enforcement Division, 512 SE 25th Ave., Pratt, KS 67124. **(Migratory game birds cannot be hunted from a vehicle, even with a disability permit.)**

HUNTER EDUCATION CERTIFICATION

Anyone born on or after July 1, 1957 must successfully complete a certified hunter education course in order to purchase a hunting license or hunt, except on lands they own or operate. Resident hunters under 16 years of age are not required to purchase a hunting license but must carry a Hunter Education Certificate (unless hunting on own land), showing they have completed the course.

Anyone under 27 years old must carry an approved hunter education certificate while hunting in Kansas. Duplicate cards are available for \$5.50 from the Pratt office.

FURHARVESTER EDUCATION CERTIFICATION

Persons born on or after July 1, 1966, must successfully complete a furharvester education course approved by Wildlife and Parks to purchase a furharvester license or hunt, run, or trap furbearers or trap coyotes on lands other than their own.

TRESPASS

Without the owner's permission, it is illegal to hunt, shoot, pursue, or trap any animal on private land, or any traveled public road or railroad right-of-way adjoining private land.

Written permission is required to enter land posted "Hunting by Written Permission Only," "Trapping by Written Permission Only," or "Hunting and Trapping by Written Permission Only."

ILLEGAL PURSUIT

No game animal, furbearer, or game bird may be shot at, killed, or pursued from a motorboat, aircraft, motor car, or other vehicle.

It is also illegal to locate or give information concerning the location of game animals by radio or other mechanical means.

No wild gamebird (except wild turkey) may be shot at or killed unless that bird is in flight. (Wild turkeys may be shot on the ground or in flight.)

WANTON WASTE

By regulation, hunters must attempt to find

any game crippled or killed. Retrieved animals must be kept until

- 1) cleaned,
- 2) eaten,
- 3) taken home,
- 4) taken to a taxidermist or processor, or
- 5) given to another person.

Pursuing wounded game onto private property without the owner's permission is trespassing. If you cannot find the landowner or get permission, contact your local conservation officer.

GETTING PERMISSION

Permission is required to hunt any private land, posted or not. Drives in the country, conversations with friends, and telephone calls to local chambers of commerce and wildlife agencies can be good ways to find areas with good game populations. County plat maps can also help.

Scouting trips should be made at least a month before the season opener. Several months is better.

Once you've found a place you'd like to hunt, contact the landowner. You can write or telephone, but the best way by far is to contact the owner in person.

Trespassers often convince landowners to close their property. Such behavior also lends strength to the anti-hunting movement.

Respect wildlife, respect landowners, and respect other hunters' rights, and you will be sure to have a rewarding experience in the rich Kansas outdoors.

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Your purchase of a hunting license is an investment in the future of Kansas wildlife. The Kansas Department of Wildlife and Parks uses your license dollars and funds from the Federal Aid in Wildlife Restoration Program (Pittman-Robertson) to manage the diverse wildlife resources of Kansas. The Pittman-Robertson program is financed by hunters through federal excise taxes on sporting equipment such as firearms and ammunition. In 1990, the department received more than \$3.1 million from the sale of hunting licenses and \$2.6 million from the Pittman-Robertson Program. Together, these two funding sources generated approximately 22.5 percent of the department's operating budget. With these dollars, the department can continue to conserve and enhance Kansas' natural heritage, its wildlife and its habitats - and ensure future generations the benefits of the state's diverse, living resources.



LICENSE, PERMIT, AND STAMP FEE TABLE *

Permit or License	Fee	Purchase office
Annual Hunting License	\$13.50 Resident (1996, \$15.50) \$60.50 Nonresident (1996, \$65.50) \$30.50 Nonresident under 16 years	Over the counter** Over the counter Over the counter
Antelope - Firearms or Archery (residents only)***	\$45.50 General \$25.50 Landowner/Tenant	Pratt Pratt
Controlled Shooting Area	\$13.50	Over the counter
Deer - Firearms*** or Archery (Resident archery permits may be obtained over the counter)	\$30.50 General \$15.50 Landowner/Tenant \$10.50 Hunt-Own-Land \$50.50 Nonresident landowner \$205.50 Nonresident "antlered" or "any deer" \$55.50 Nonresident "antlerless only"	Pratt Pratt Pratt, reg., & parks Pratt Pratt only*** Pratt only***
Disability	\$ 3.50	Pratt, reg., & parks
Dogs - Commercial	\$20.50	Pratt, reg., & parks
Dogs - Field Trial	\$20.50	Pratt, reg., & parks
Dogs - Special Event (field trial on public land.)	\$100.00 Cashier check deposit	Pratt, reg., & parks
Duplicates (all permits)	\$5.50	Pratt, reg., & parks
Elk - Firearms*** (residents only)	\$100.50 General \$50.50 Landowner/Tenant	Pratt Pratt
Fur Dealer	\$100.50 Resident \$200.50 Nonresident	Pratt Pratt
Furharvester	\$15.50 Adult \$ 8.00 Junior \$250.50 Nonresident	Over the counter Over the counter Pratt only
Game Breeder	\$10.50	Regional
Lifetime License (residents only)	\$240.50 Hunt \$240.50 Fish \$440.50 Combination	Pratt (if paid quarterly add \$40)
Turkey, Fall (firearms*** or archery, one-bird limit)	\$20.50 General \$20.50 Resident Archery \$10.50 Hunt-Own-Land \$10.50 Landowner/Tenant \$30.50 Nonresident	Pratt Over the counter Pratt, reg., & parks Pratt Pratt (firearms)
Turkey, Spring (archery or firearms, one-bird limit)	\$20.50 General \$10.50 Hunt-Own-Land \$10.50 Landowner/Tenant \$30.50 Nonresident (unlimited unit)	Pratt, reg., & parks Pratt, reg., & parks Pratt, reg., & parks Pratt, reg., & parks
Waterfowl	\$3.25 State Waterfowl Stamp \$20.50 48-hour waterfowl \$5.50 Special dark goose units \$15.00 Federal Waterfowl Stamp	Over the counter Over the counter Pratt U.S. post offices

*Some areas may require special permits and fees for all hunting or for certain species.

** "Over the counter" means select county clerks, vendors, and Department offices.

***All or portions of the state may have a limited competitive draw for permits.

STATE PARK FEES	1995	1996
One-day vehicle park permit	\$ 3.00	\$ 4.00
Annual motor vehicle park permit	20.50	\$ 30.00
Second-vehicle park permit	5.50	\$ 15.00
Overnight camping park permit (per night, per unit)	3.00	\$ 5.00
Annual camping permit	35.50	NONE
Utilities	5.00	See Below

Park permits are available at all state parks, select Wildlife and Parks offices, county clerks and some vendors. In 1996, utilities will be \$5 for one hookup, \$6 for two, and \$7 for three. Fees listed include a \$.50 issuance fee. Some county clerk vendors may charge as much as \$1.00 additional issuance fee.

Fees on this page are subject to change.

GENERAL HUNTING REGULATIONS

FURBEARERS

FURBEARER DEFINED

Species legally taken as furbearers in Kansas are badger, bobcat, beaver, gray fox, red fox, swift fox, mink, muskrat, opossum, raccoon, striped skunk, and weasel.

GENERAL LEGAL EQUIPMENT

Furbearer and Coyote Hunting-- centerfire and rimfire rifles and handguns (except fully automatic), shotguns, muzzleloaders, cap and ball pistols, archery equipment, and crossbows.

Furbearer and Coyote Trapping-- leg hold and body gripping steel traps, padded leg hold traps, box traps, snares, and dead falls.

USE OF ARTIFICIAL LIGHT

.22 cal. rimfire rifles and handguns may be used to take trapped furbearers or coyotes - or furbearers treed with the aid of dogs -- when using hand-held, battery-powered flashlights, hat lamps, or hand-held lanterns.

WATER SETS

"Water set" means any trapping device in which the gripping portion is placed or set in contact with flowing or impounded waters and remains in contact with the water.

SPECIAL EQUIPMENT

Calls, lures, baits and decoys may be used in taking furbearers and coyotes. Motor vehicles may be used to hunt coyotes. Radios in land or water vehicles may be used while taking coyotes.

CONIBEAR-TYPE TRAPS

Conibear-type, body-gripping traps with jawspreads eight inches or greater may only be used in water sets.

SNARES

Snares are prohibited for use in dryland sets within 50 feet of the outside edge of a public road or within five feet of a fence bordering a public road.

However, landowners and tenants or their immediate families or agents may use snares in the right-of-way adjacent to their lands. Snares must be tagged with the user's name and address.

HUNTING AND TRAPPING

Season: badger, bobcat, mink, muskrat, opossum, raccoon, swift fox, red fox, gray fox, striped skunk, weasel.

Eastern Unit: Nov. 15-Feb. 15, 1996

Western Unit: Nov. 15-Jan. 31, 1996

Limit: None on species that can legally be taken.

BEAVER TRAPPING

Eastern Unit: Nov. 15-March 31, 1996

Western Unit: Jan. 1-Feb. 15, 1996

Limit: None.

NO OPEN TRAPPING OR HUNTING SEASON ON ANY OTHER FURBEARERS

RUNNING

Season: opossum, raccoon, red fox, and gray fox

Eastern Unit: March 1-Nov. 1, 1996

Western Unit: Feb. 15-Nov. 1, 1996

Limit: These furbearers cannot be killed or taken during the running season. Furharvester license required.

It is illegal to possess any firearm or other

weapon while pursuing furbearers during the running season.

NOTE: All furbearer seasons begin at noon of the prescribed opening day, and close at midnight of closing date.

FURBEARER HABITAT PROTECTED

It is unlawful to destroy any muskrat house, beaver dam, mink run, or any hole, den, or runway of any furbearer, or to cut down or destroy any tree that is the home, habitat, or refuge of any furbearer. However, owners and legal occupants of land may cut down trees or kill furbearers found in or near buildings or doing damage if non-lethal efforts have failed to solve the problem.

TRAP TAGGING AND TENDING

All traps, including snares and deadfalls, must be tagged with the user's name and address. They must be tended and inspected at least once every day.

POSSESSION PERIODS

Live furbearers legally acquired during the furharvesting seasons may be kept only through the last day of the season. Unskinned carcasses may be kept for not more than 48 hours following the closing of the season. Raw pelts may be kept not more than 30 days following the closing of the season in which they could legally be taken, except for species with a running season, which may be kept not later than one day prior to running season. **Exceptions may be granted by special permit. Check with your local conservation officer.**

Coyotes and bobcat pelts with export tags, may be possessed for an unlimited time.

A furdealer's license is required to buy furbearers or coyotes. They can only be sold to authorized fur dealers.

BOBCAT & SWIFT FOX - TAGGING

Bobcats and swift foxes must be pelt tagged within 48 hours after the season closes.

COYOTES - HUNTING & TRAPPING

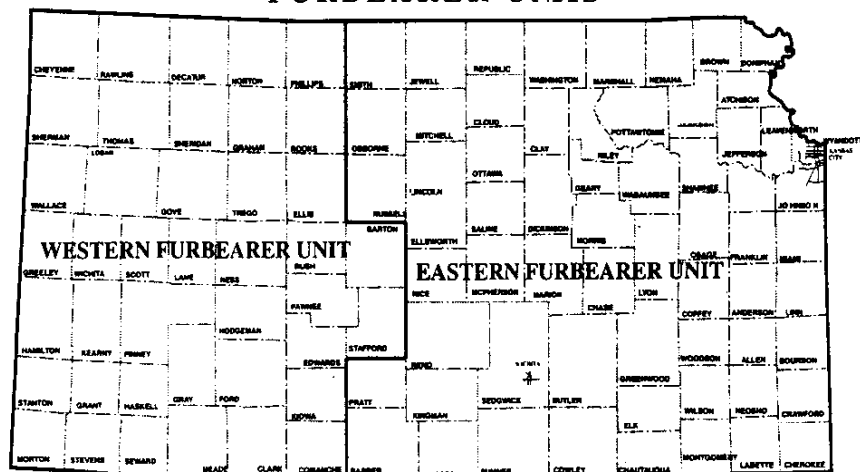
There is no closed season for trapping or hunting coyotes. They may not be hunted by aid of artificial light. Furharvester license required to trap; hunting license required to hunt.

ANIMAL DAMAGE CONTROL

Except for river otter and spotted skunk, furbearer pelts and carcasses may be possessed after damage control activities if

- 1) the person doing the damage control has a furharvester license (if required), and
- 2) a permit has been issued by Wildlife and Parks authorizing possession and disposal of the pelts or carcasses.

FURBEARER UNITS



SWIFT FOX INVESTIGATIONS IN COLORADO (1995)

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ABSTRACT

Two swift fox projects were ongoing in 1995: One involved an intensive analysis of swift fox ecology in an area on and adjacent to the Pawnee National Grassland in north-central Colorado. Seventy four fox were radio-collared from October 1994 through December 1995. Twenty-three foxes (31%) have been found dead during the study. Of 15 adult females alive in May and June, nine (60%) produced litters that emerged from their dens. Den site characteristics for 63 dens used in 1994-95 as pup-rearing (15) or diurnal dens (48) were obtained. The other project involved an extensive sampling of 72 randomly selected 3x4 mile sites in eastern Colorado. Swift fox were live-trapped to determine presence or absence on 33 of the sites in 1995. In 2185 trap nights of effort, 120 swift fox were captured. The Colorado Division of Wildlife (CDOW) and University of Northern Colorado (UNC) cooperated on both projects.

INTRODUCTION

The swift fox is a resident of the short-grass prairie and associated agricultural lands in eastern Colorado. Until 1995 the swift fox was classified as a furbearer and legal take allowed. Harvest for the period 1982-1991 averaged 880 animals per year. In 1995 the Wildlife Commission closed the season on swift fox as result of a new policy that directed sport harvest of furbearers towards those species involved in damage. The swift fox is still classified as a furbearer. Landowners are still allowed to take swift fox on their own property or leased (including Federal and state grazing leases) land if the animals are causing damage.

Swift fox investigations in Colorado have centered mainly on the Pawnee National Grassland area in Weld County (Fitzgerald 1981). Investigations have also occurred on the federally owned Pinon Canyon Maneuver site in south-east Colorado during the late 1980's (Covell and Rongstad 1990). There have been no organized attempts to survey private land in Colorado for swift fox presence or abundance until 1995.

Division of Wildlife goals for swift fox in Colorado include documenting abundance across the eastern plains, determining habitat preferences (including dens site characteristics) and determine population viability.

METHODS

Extensive- After consultation with staff statisticians, 72 randomly selected live-trapping grids were selected. Using 1:100,000 scale vegetation maps the state was divided into 4 tiers of N-S oriented latilong blocks, each block was gridded onto 3x4 mile plots with the amount of native prairie estimated for each plot. Plots with 75% or more prairie and 50% to 74% were grouped and plots chosen from these groups. No sampling was done in plots with < 50% native prairie. Six hundred seventy six plots encompassing 8,112 square miles were estimated to have > 75% prairie, 449 plots encompassing 5,388 square miles had 50%-74% prairie. Forty four plots were chosen from the > 75% plots and 28 plots from the 50-74% group. After selection of the plots local CDOW officers contacted local landowners, explained the project and asked for permission to trap. Due to this effort and the cooperation of the Colorado Cattleman's Association and Farm Bureau the CDOW received access to > 90% of the plots.

Live-trapping methods consisted of placement of one 12x10x32 inch wire-mesh live-trap at each section corner on the 3X4 square mile grid. This resulted in 20 traps per plot. Traps were baited with dead turkey chicks and commercial lure (Erickson's, On Target ADC). Traps were run for a minimum of 4 consecutive nights (range 4-8, average 4.5). Traps were checked daily, starting 1/2 hour before sunrise. Captured foxes were ear-tagged, sexed and condition noted before release. Crews also noted vegetative type in area, distance to active prairie dog colonies and other wildlife caught in the traps.

Intensive- A copy of the Federal Aid progress report is included as an Appendix to this report.

RESULTS

A total of 33 plots were completed by 31 December 1995. A total of 120 swift fox were captured in 2815 trap nights. Captured foxes included 62 males, 57 females and one unknown (escaped prior to sexing). Swift fox were captured on 21 of 33 plots sampled (64%). Swift fox were observed, but not captured on two plots. The total effective area sampled in 1995 was 650 square miles. Numbers of fox captured varied from one per 20 square miles to 20 per 20 square miles. The mean was 5.7 fox per 20 square miles for the 21 plots with fox and 3.6 per 20 square miles for all plots. Catch per 100 trap nights by month varied from 16.4 in November to 0.2 in July. June and July were the most difficult months to trap fox and March and November the easiest. Colorado experienced an extremely wet spring and summer which may have influenced trap success. Capture success was highest for trap nights two and three (5.4 and 6.1 fox/100 trap nights respectively) compared to nights one and four (2.7 and 2.8 respectively).

Plots 2 and 19 were located on the Pinon Canyon Maneuver Site in southeast Colorado, studied by Rongstad et al. (1989). Twelve swift fox were captured in 8 trap nights. Despite the high mortality noted by Rongstad during the late 1980's it appears swift fox are endemic in this area. The 36 fox captured on the Pawnee N.G. compare favorably with the 40 animals caught by Fitzgerald (1983) in the same area from 1979-1981. This data coupled with the information obtained from the intensive study in the same area may suggest that swift fox populations have actually increased in the Pawnee area.

Seven plots had active black-tailed prairie dog colonies and three sites had inactive colonies. A total of 14 swift fox were caught on plots with active prairie dog colonies. Nine fox were caught on sites with inactive colonies. Vegetative work is being analyzed this winter and the data should be available 1 July 1996.

Intensive- See enclosed report.

EXPENDITURES

Total cost of the swift fox inventory for 1995 was approximately \$43,000. this expenditure is from the Game Cash fund of the CDOW. The University of Northern Colorado also contributed resources as did the National Science Foundation to the intensive study.

DISCUSSION

Swift fox were found in 4 counties where they had not been previously identified. In addition, swift fox have been marked in 9 counties where their prior occurrence had not been documented (anecdotal information only). There appears to be no positive correlation between swift fox occurrence, and perhaps abundance with active prairie dog colonies. In fact, there may be some negative correlation due to higher coyote populations near active prairie dog towns. The 74 captures during the intensive study in Weld County compares favorably with the highest previous numbers of swift fox captures in the literature. Swift fox populations in the Pawnee Grassland area appear to be above levels reported by Fitzgerald et al. in 1981. Data is still being analyzed with regards to mortality, however, mortality rates are similar to those reported by O'Farrell (1987) on kit fox.

LITERATURE CITED

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- O'Farrell, T.P. 1987. Kit fox. Pages 422-431 in M. Novak, J.A. Baker, M.E. Obbard, and B. Malloch, eds. Wild furbearer management and conservation in North America. Ministry of Natural Resources, Toronto, Ontario.
- Rongstad, O.J., T.R. Laurion, and D. E. Andersen. 1989. Ecology of the swift fox on the Pinon Canyon Maneuver Site, Colorado. Final Report to the Directorate of Engineering and Housing, Ft. Carson, Co. 53pp.

PRELIMINARY RESULTS OF ECOLOGICAL INVESTIGATIONS OF THE SWIFT FOX (*Vulpes velox*) IN NORTHERN WELD COUNTY, COLORADO, OCTOBER 1994 - SEPTEMBER 1995.

J. P. Fitzgerald and B. Roell, Department of Biological Sciences,
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ABSTRACT

Research started in mid-October 1994 on the ecology of swift fox on the Central Plains Experimental Range (CPER) and adjacent sections of the Pawnee National Grassland. The CPER study area covers 96 km². Study began in March 1995 on a second site of 52 km² located on the Pawnee National Grassland (G1 site) 10 km east of the CPER area. On the CPER we have radio-collared 25 male swift fox (19 adult, 6 juvenile) and 23 females (15 adult, 8 juveniles). Twenty swift fox, 11 adult males and 9 adult females have been captured and radio-collared on the G1 area. Thirteen (19%) of the 68 radio-collared foxes have been found dead with the fate of an additional 18 (26%) animals unknown. Ten of the 13 dead animals were killed by coyotes, 2 by automobiles, and 1 by slipping a foreleg through its radio collar. No pups radio-collared in fall, 1994 on the CPER site are known to be alive. Seven of 8 pups have been radio-collared in August-September 1995. Reproductive success has been low in 1995. Nine females produced litters that came above ground. Six had litters of 2 pups, 3 had litters of 1 pup. No pups emerged from dens of 4 other females believed to be caring for pups in the den. Some individuals have moved over 7 km from their sites of capture. Others are staying within 1-2 km of their capture sites. Den use changes frequently. Locations where foxes were trapped, and sites of dens being used by radioed foxes are concentrated on rolling, short-grass prairie uplands, with few animals using the saltbush communities scattered across the sites. Several animals whose home ranges border on cultivated and fallow lands have been located by radio on those areas but only infrequently. Two male foxes that ventured onto plowed fields, and a female in a winter wheat field were killed and buried by coyotes. Data is still acquired on home range, movements, and similar behaviors.

INTRODUCTION:

The swift fox is a small canid (1.5-3.2 kg) that occupies short-grass and mixed prairie grasslands from southern Canada to Texas. Unlike many canids it spends its time when not hunting in a den. Populations of swift foxes across their total range declined dramatically in the early and mid 1900's. Populations are low in numbers and fragmented in northern plains states. Canada declared the species extirpated in 1978. In the 1970's and 1980's populations, especially in southern parts of the range, showed recovery. Colorado, Wyoming, Kansas and New Mexico probably have the largest populations. Historically, swift fox were not protected in Colorado. Annual harvest averaged 2,015 animals per year from 1974-1981. Since 1982 harvest averaged 887. The Colorado Wildlife Commission has recently closed take on both swift and kit foxes. Colorado and Wyoming have provided wild caught animals to the Canadian government to restock the species. Despite signs of recovery in its southern range, a private citizen, in 1992, petitioned the U.S. Fish and Wildlife Service to list the species endangered under the Endangered Species Act. The Fish and Wildlife Service has concluded that "listing is warranted but precluded at the present time" and placed the species in a Priority 8 category. Literature on the species has been reviewed by Egoscue (1979), Scott-Brown et al. (1987), and in U.S. Fish and Wildlife Service Documents (90-day and 12-month administrative findings on petition to list the swift fox).

The present project has the following objectives: 1. Monitor movements and population dynamics of a minimum of 60, radio-collared swift foxes on or within 40 km of the Central Plains Experimental Range (CPER) site; 2. Document swift fox use of habitat types including shortgrass prairie, saltbush communities, fallow lands, and cropped dry land areas; 3. Investigate swift fox-mountain plover relationships in terms of habitat use and possible fox predation on plovers; 4. Document reproductive success and evaluate natal den characteristics. 5. Evaluate methods for estimation of swift fox density and/or population trend; 6. Compare present status and distribution with results obtained from swift fox research in the late 1970's and early 1980's on the Pawnee National Grassland (PNG); 7. Work with the CDOW to develop specific management plans for the species in the state. The study is being supported by NSF through the Long-term Ecological Research program sponsored by Colorado State University and by the Colorado Division of Wildlife.

METHODS:

The CPER study area covers approximately 96 km² and is located in northwestern Weld County, Colorado. The site is managed by the U.S. Department of Agriculture as an experimental range. It is also the location of the Long-term Ecological Research program (Pawnee Site) for studies on short-grass steppe. Some of its land borders the Pawnee National Grassland, administered by the U.S. Forest Service. In March, 1995 we initiated trapping and radio-collaring of foxes on a second site of approximately 52 km² located on the Pawnee National Grassland (G1 site) 10 km east of the CPER area. That location represents the center of research efforts on swift fox ecology conducted in the late 1970's and early 1980's by University of Northern Colorado personnel (Fig 1).

Swift foxes are live trapped on the CPER using 28 X 30 X 84 cm wire-mesh traps baited with carrion, dead turkey chicks, and a commercial scent (fish and chicken, Erickson's On Target A. D. C.). Trapping methods have varied slightly. On the CPER we have placed traps about 1 km apart and left them set for 3-4 trap nights, or set traps at specific locations where we are trying to catch specific individuals (i.e. pups). On the G1 site we trapped all 20 radio-collared animals

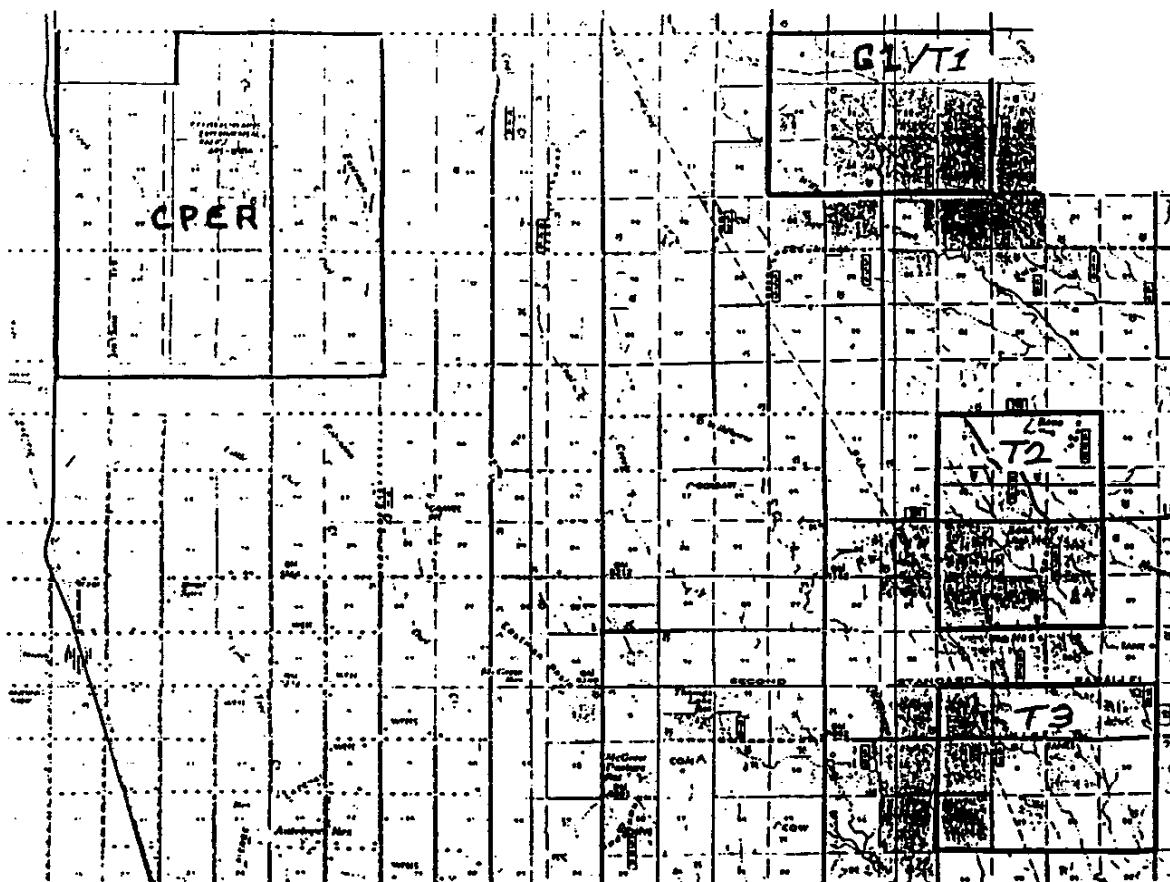


Figure 1. Location of intensive study areas CPER and G1(T1) and proximity to T2 and T3 eastern plains survey plots, Colorado.

using a 3 X 4 square mile trapping grid with traps set at each section corner and baited only with turkeys and commercial lure. G1 traps were set for 8 consecutive nights. We are presently trying to trap and recollar animals by placing traps near their den sites. Captured animals are sexed, aged (pup or adult), ear tagged, weighed, measured and equipped with radio-collars. Animals are released at their points of capture. Radio-collared animals are monitored on a regular basis to determine: locations of dens, movements from dens, and habitat occupancy. Monitoring is conducted using hand-held or truck mounted receivers. Locations of foxes are plotted on quadrangle maps. All dens are mapped on quadrangle maps.

RESULTS:

Sixty-eight swift fox have been captured and radio-collared in slightly over 720 trap nights of effort. All animals have been captured on the CPER or on site G1. Animals captured on the CPER include 19 adult males, 6 male pups, 15 adult females, and 8 female pups. On G1 we have captured 11 adult males and 9 adult females. Two other animals (female pup, adult male) have been captured and ear-tagged but not collared.

Table 1. Sex and age of swift fox radio-collared on the CPER and Pawnee National Grassland study sites, October 1994 to September 1995.

Site	Sex and Age of Foxes				Totals
	Males		Females		
	Adult	Pup	Adult	Pup	
CPER	19	6	15	8	48
Pawnee	11	0	9	0	20
Total	30	6	24	8	68

A number of recaptures of animals has been made with one individual captured 11 times and several others 3-7 times. Most animals are wary after the first trapping experience. Some of the radioed animals are probably transients moving across the site, we have no records of 3 animals after their first capture night.

Survivorship of adult animals (47% CPER, 55% on G1) on both sites is similar (Table 2) however, radio-collars have only been on foxes in the G1 plot for slightly over 5 months compared to almost 12 months for some animals on the CPER. Although data suggest that over 50 percent of the animals are surviving, 9 animals (13%), including 8 pups have only been radioed 2-4 weeks. All animals aged as pups in the fall of 1994 are dead or missing. Of 13 dead animals recovered 10 were killed by coyotes, 2 by automobiles, and 1 that got its foreleg through the collar. A second animal had a similar collar situation but was recaptured, the collar removed, and the animal rehabilitated until it could be released. A pup of undetermined sex was found outside its den a few days after its mother was killed by a coyote.

Table 2. Survivorship of radio-collared animals, CPER and Pawnee National Grassland sites October 1994 - September 1995. Percentages are shown in ().

	Sex and Age of Foxes						
	Males		Tot Male	Females		Tot Female	Total
	Adult	Pup		Adult	Pup		
CPER							
Alive	7(37)	4(66)	11(44)	9(60)	5(62)	14(61)	25(52)
Dead	5(26)	1(17)	6(24)	3(20)	2(25)	5(22)	11(23)
Unknown	7(37)	1(17)	8(32)	3(20)	1(13)	4(17)	12(25)
Totals	19(100)	6(100)	25(100)	15(100)	8(100)	23(100)	48(100)
Pawnee							
Alive	5(45)			6(67)			11(55)
Dead	1(10)			2(22)			3(15)
Unknown	5(45)			1(11)			6(30)
Totals	11(100)			9(100)			20(100)

Reproductive success in 1995 was low. On both sites, 9 females had litters. Six females had litters of 2 pups each, 3 females only had single pups. To date we have captured and tagged or radio-collared 8 of those pups. Four other females

were suspected of having pups based on their behaviors and hunting habits (i.e. carrying food back to dens) but no pups were ever observed above ground.

We are gathering data on home range and movements on a number of foxes. A number of foxes, especially adult females with pups, were observed to be active during the heat of the day throughout the summer, even on days when temperatures exceeded 100 F. Foxes of all sex and age groups are staying almost exclusively on short grass prairie or saltbush communities. Several animals with home ranges on the border of cultivated and fallow lands are hunting in those habitats but infrequently. Conservation reserve program lands are not being used by foxes. Two animals, both males that ventured onto plowed fields were killed by coyotes. Located dens are mapped and a student will be starting work in 1996 on physical characteristics of habitat at dens with emphasis on natal denning areas.

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Scott-Brown, J. M., S. Herrero, and J. Reynolds. 1987. Swift fox. Pp. 432-441 In M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, Eds. Wild furbearer management and conservation in North America. Ontario Trappers Assoc., Ont.

SWIFT FOX SURVEYS IN WYOMING - ANNUAL REPORT

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FREDERICK G. LINDZEY (Principal Investigator) Wyoming Cooperative Fish and Wildlife Research Unit, Box 3166 University Station, Laramie, WY 82071;

REG ROTHWELL (Supervisor, Biological Services), Wyoming Game and Fish Department, 5400 Bishop Blvd., Cheyenne, WY 82006.

ABSTRACT

We performed a large-scale field survey using spotlighting and tracking plates to determine the distribution of swift foxes (*Vulpes velox*) in Wyoming. Forty-three transects were run along public roads within swift fox historical range from March to September, 1995. Thirty-seven swift fox occurrences were documented in 8 of 12 counties sampled. Swift foxes were found as far west as Lost Lake in the Red Desert, and as far north as Weston county. These observations complemented by Wyoming Game and Fish Department (WGFD) observation records and trapper surveys suggest swift fox are still found throughout their historic range in Wyoming although results in Crook, Sheridan, and Campbell counties were inconclusive. Tracking plates revealed more swift foxes than spotlight surveys from March to mid-June, whereas spotlighting detected more swift foxes from mid-June to September, although not significantly so. We found swift foxes in shortgrass, mixed-grass, sagebrush-grassland, and sagebrush-greasewood habitat types with topography ranging from flat to badland-like terrain. The WGFD trapper survey suggested that swift foxes also may be found west of the estimated historic distribution near Cody, Hyattville, and Fontenelle Reservoir.

INTRODUCTION

The swift fox (*Vulpes velox*), the smallest prairie-dwelling canid in North America, was found historically in portions of the Great Plains from Canada to Mexico (Carbyn et al. 1994). Homesteading of the prairies during the 1800s likely marked the beginning of the swift fox's decline. Probable reasons for its decline included destruction of native prairie habitat, intense commercial trapping, and large scale poisoning campaigns aimed at wolves (Scott-Brown et al. 1987). During the 1950's, swift fox sightings increased in parts of the U.S. (Carbyn et al. 1994) including Wyoming (Long 1965). Swift fox data in Wyoming is largely anecdotal, including several verified sightings in southeastern Wyoming around 1976 (Floyd and Stromberg 1981, WGFD, Wildlife Observation System (WOS) records), and results of a mail survey of trappers and biologists done during the mid-1980's (Lindberg 1986).

In 1992, the U. S. Fish and Wildlife Service (USFWS) received a petition to list the swift fox as threatened/endangered in at least the northern portion (Montana, North and South Dakota, and Nebraska), if not the entire historic range. After reviewing existing data, the USFWS concluded in its Administrative Finding that the listing was warranted but precluded. This finding will be reviewed in one year (Spring 1996). Comments and information submitted by state wildlife agencies will be considered by the USFWS in its review of the finding and subsequent actions.

The objective of this project was to determine the current distribution of swift fox within its historic range in Wyoming.

METHODS

Although researchers have employed a variety of techniques to determine swift fox presence or absence in small areas, none had surveyed large areas, and it was not known what survey methods would perform best over large areas. We selected survey methods that appeared logistically feasible over a large area, were cost effective, and were less likely to harm foxes than trapping. Results of our initial investigations in southeastern Wyoming indicated spotlighting and tracking plates both could detect foxes, at least in areas with similar densities of foxes.

We used tracking plates and visual observations during spotlight surveys to determine swift fox presence within their estimated historic distribution (Fig. 1)(Long 1965). We ran 48 tracking-plate transects (Fig. 1, Appendix B) between March and September, 1995. Six tracking-plate transects were run by volunteers; 2 were run by another Wyoming Cooperative Fish and Wildlife Research Unit (WCFWRU) researcher on Warren Air Force Base, Cheyenne, 1 by a WGFD biologist in Johnson county, 1 by a USDA Forest Service biologist, and 3 by a WGFD game warden in Weston county. Volunteers were trained beforehand and given standardized survey protocol to follow (Appendix C).

Tracking plates were made of 16 gauge sheet-steel measuring 61 × 61 cm (24 × 24 in) and covered with soot from an acetylene torch flame, a carbon/alcohol mixture, or a talc/alcohol mixture. About 15g of canned jack-mackerel was placed in the center of the tracking plate as an attractant. We placed the tracking plates along public roads within the public property easement, spaced about 1.6 km (1 mi) apart along 16-76 km (10-47 mi) transects. During our initial tests we left plates out for 4 nights (transects 1-5). For the remainder of the transects we left the plates out for 2 successive nights because visitations by swift foxes did not increase after 2 nights during our initial surveys. When an animal visited a tracking plate, the tracks were identified, recorded, the plate recoated with tracking agent, and fresh bait applied. Fresh bait also was reapplied when the bait had dried or was gone on unvisited plates. Swift fox tracks found on a plate were "lifted" using clear 4.8 cm (1.875 in.) adhesive packing tape and retained for later reference.

We used 200,000-400,000 candlepower (cp) hand-held spotlights during transects 1-4 and then a 100,000 cp roof-mount spotlight for the remaining transects. Spotlight surveys were run along tracking-plate routes between 19:00-06:00 hours while driving at speeds between 24-40 kph. We spotlighted each route once per night for 4 nights during transects 1-4, and once per night for 2 nights for the remaining transects. During the late summer, some transects were spotlighted twice in 1 night to complete more transects in a shorter time. When eyeshine was spotted, we used 10 x 28 or 20 x 80 binoculars to identify animals. Most transects required between 2-4 hours to complete, depending on the number of animals seen. Animal locations were estimated using a Global Position System (GPS) unit.

We initially stratified areas into expected high and low density (Laramie and Albany counties included the only high-density strata). For statistical comparisons, individual transects were the experimental unit, thus a survey method within a transect received a score of 1 if swift foxes were detected, or a 0 if not. We included only transects containing both tracking plate and spotlight surveys in our statistical tests. We used chi-squared tests (SAS Inst. Inc., 1989) to compare methods and the computer program PASS (NCSS, Kaysville, UT) to estimate power of the statistical test.

During the summer of 1995, the WGFD included a request for swift fox information with its annual trapper survey mail questionnaire. The request included a letter briefly outlining the current swift fox situation, the importance of collecting more data on the species, and how to document sightings on an

accompanying map of Wyoming (the swift fox survey will be sent to all furbearer license holders in future years to monitor swift fox takings and to add to the data base on distribution).

RESULTS

Tracking-plate transects ($n = 6$) detected more swift foxes than spotlight ($n = 4$) surveys ($\chi^2 = 2.4$; $df = 1$; $P = 0.27$; power = 0.23) from March to late-June, but the difference was not significant. Spotlight surveys ($n = 4$) detected more swift foxes than tracking plates ($n = 2$) ($\chi^2 = 0.75$; $df = 1$; $P = 0.33$; power = 0.14) between late-June and September, but again the difference was not significant.

We completed a total of 1600 km (994 mi.) of tracking plate transects (2298 tracking plate/nights) and 1384 km (860 mi.) of spotlight survey transects (1868 mi. total spotlighted) between March and September, 1995. We documented 37 swift fox occurrences (Fig. 2, Appendix A) during this effort. Swift foxes were found in Laramie, Albany, Converse, Fremont, Goshen, Natrona, Sweetwater, and Weston Counties (Fig. 2). We found swift foxes in shortgrass, mixed-grass, sagebrush-grassland, and greasewood-sagebrush habitat types with topography ranging from flat to badland-like terrain. We added 3 additional swift fox locations to our database in this report; 1 found road-killed, 1 chance observation by a WGFD Warden, and 1 by a WCFWRU researcher working on an unrelated project.

The WGFD mailed 900 trappers surveys and received 286 responses. Of those responses, 29 maps were returned with swift fox locations plotted (Fig. 3). Most of the 29 sightings were concentrated in southeastern Wyoming; however, several sightings were reported as far west as the Big Horn and Green River Basins.

Information from the WGFD WOS database (Fig. 4), WGFD black-footed ferret (*Mustela nigripes*) spotlight surveys (Fig. 5), and from USDA Forest Service, Thunder Basin National Grassland personnel also were included in this report to complement our observations. In addition, we recorded the locations of red foxes (*Vulpes vulpes*), spotted skunks (*Spilogale* spp.), bobcats (*Felis rufus*), raccoons (*Procyon lotor*), badgers (*Taxidea taxus*), long-tailed weasels (*Mustela frenata*), ermines (*Mustela erminea*) during our surveys (Appendix C). Casual observations of mountain plovers (*Charadrius montanus*), sage grouse (*Centrocercus urophasianellus*), and burrowing owls (*Speotyto cunicularia*) were also noted (Appendix C).

DISCUSSION

Our survey was designed under the assumption that it would be a single-year effort and, accordingly, we attempted to sample systematically throughout the historic range of the swift fox in Wyoming, emphasizing the peripheral parts of the historic range. Although the effectiveness of our survey techniques was untested on a large scale, we feel the survey yielded a conservative, but credible estimate of current swift fox distribution in Wyoming. We saw swift fox or found their sign over most of their historic range despite the restricted nature of our survey effort. Trapper survey results and WOS data generally corroborate our survey information. The general absence of observations in the far northern portions of the swift fox's historic range may reflect the private ownership and limited access in this area.

Differences in the performance of track plates and spotlighting during our surveys may have been due to vegetation changing throughout the period and/or behavior of the foxes. Tall vegetation along some public roads during the latter part of the survey period may have prevented swift foxes from using these areas. Canadian researchers live-trapping swift foxes during August, 1995 near Cheyenne had

similar results. They captured more swift fox in pastures with short vegetation than in pastures with tall vegetation (S. DeCecco, WGFD, pers. comm., 1995). Also, the wet spring may have increased the swift foxes' prey base, reducing the effectiveness of the mackerel bait as an attractant. We found unconsumed mackerel baits on the tracking plates visited by swift foxes during summer, whereas during the late winter and early spring, baits were gone when swift fox tracks were found.

We found swift foxes in habitats considered non-typical such as the badland-like areas west of Casper and greasewood flats northwest of Rawlins. Other researchers have reported swift foxes occupying non-typical habitat types such as ponderosa pine/grassland habitats (Bob Hordorff, USFS, Buffalo Gap National Grassland, pers. comm., 1995) and cultivated fields (Lloyd Fox, Kansas Game and Parks Dept., pers. comm., 1995).

Coyotes are thought to be a predator of swift foxes (Scott-Brown et al. 1987), and some authors have hypothesized that red foxes or coyotes may limit swift fox abundance. In California, Ralls and White (1995) found coyotes and red foxes to be predators of San Joaquin kit foxes. While we were not able to examine the interactions among coyotes, swift foxes and red foxes, we observed a swift fox about 2000 m from an adult and juvenile red fox in Fremont county, and in the Red Desert coyotes were seen consistently in areas where swift foxes were found.

Absence of swift fox during our surveys in the north and northeastern areas of their historic range in the state may indicate foxes were not there. However, we may have sampled the wrong areas, sampled too little, or our methods simply were not sensitive enough to detect foxes at low densities. Large blocks of private land and limited public roads may have prevented us from sampling as intensively and efficiently as we had other areas. Future sampling in these areas will require increased sampling effort and/or a more sensitive survey technique. Private lands will need to be surveyed.

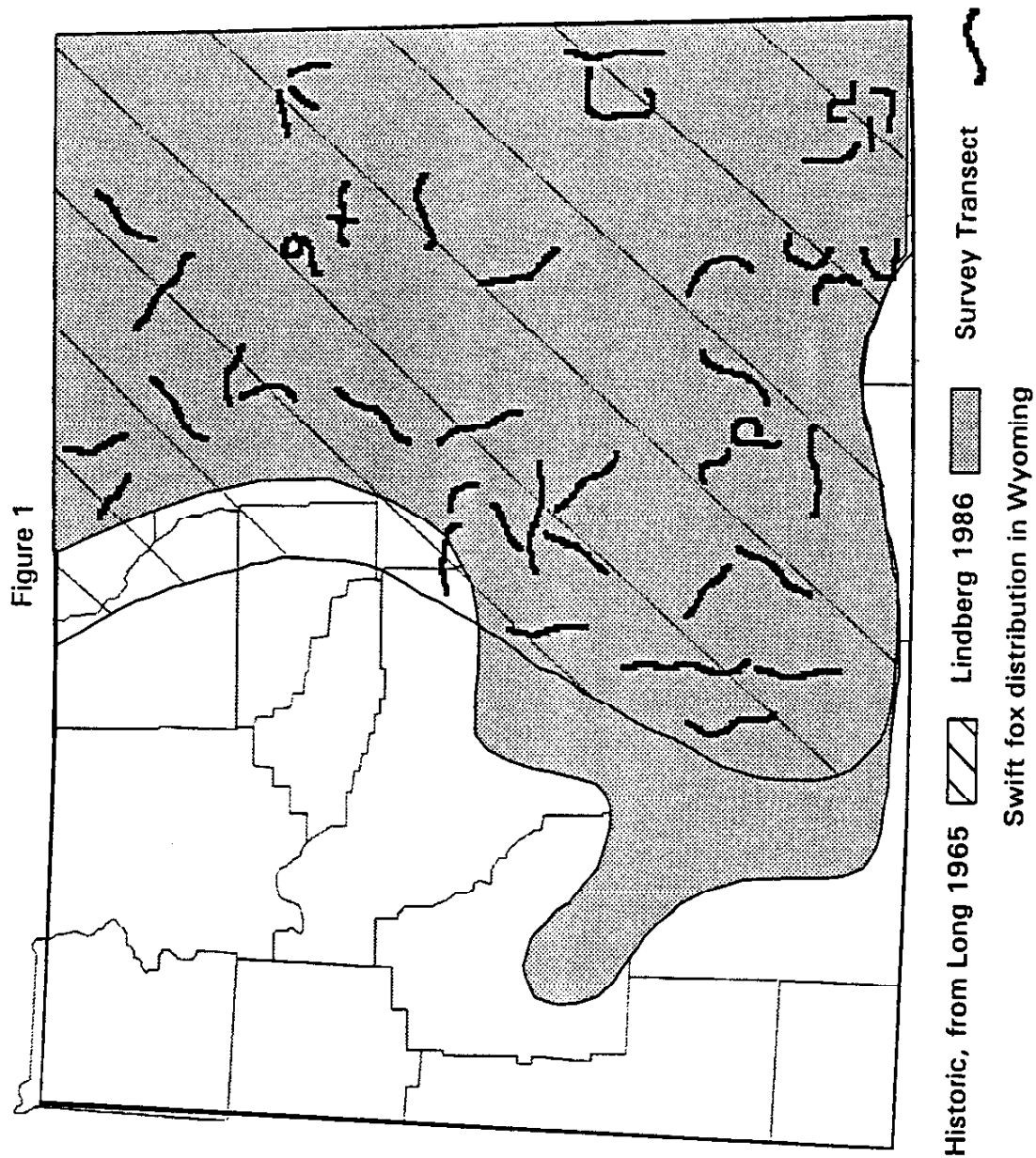
Future research should include evaluations of survey techniques. Ideally, techniques would be evaluated in an area of known swift fox density. Understanding the strengths and weaknesses of each technique and their sensitivity to changes in population size will help determine the best survey methods for monitoring programs. Data on swift fox density will be needed to address the proposed listing of this species under the Endangered Species Act. Estimating density until new census techniques are developed will require the capture and marking of swift foxes in the various habitats where they are found in Wyoming.

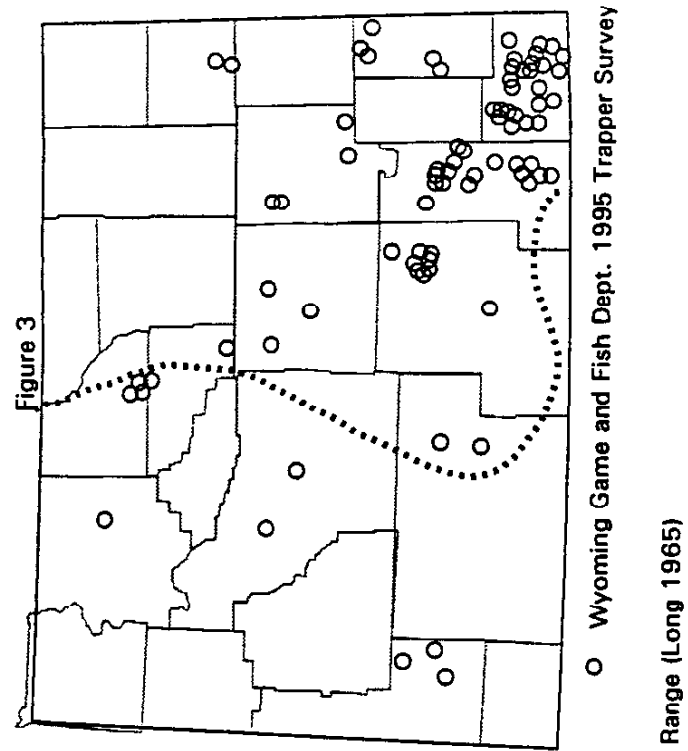
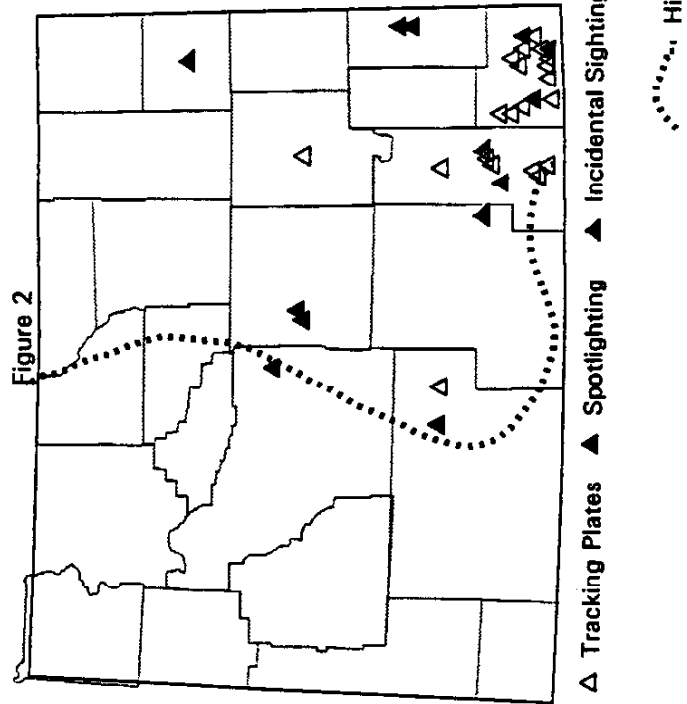
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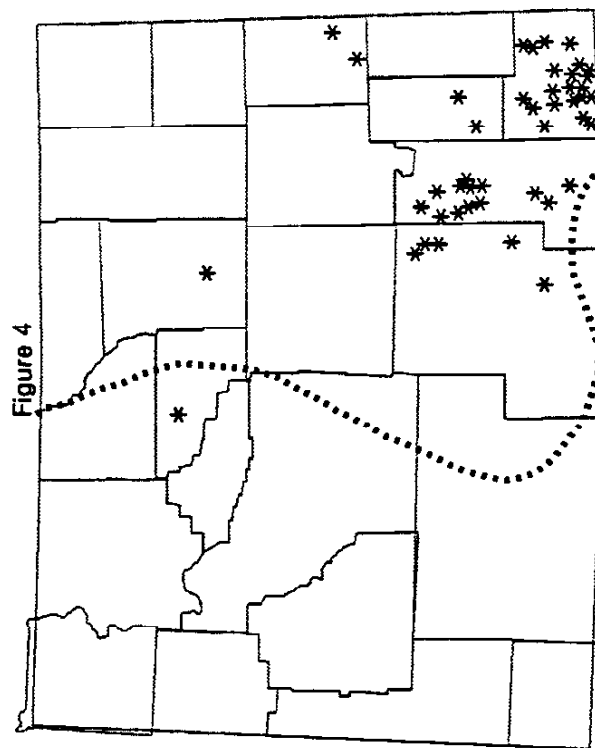
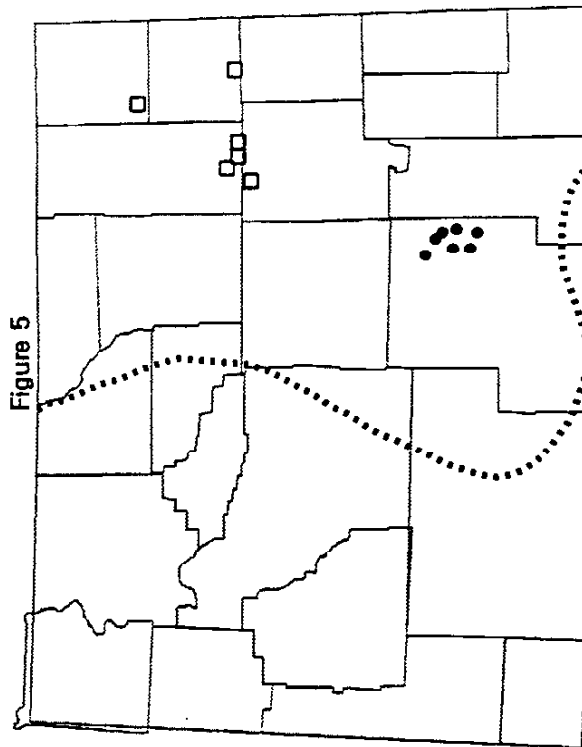


Figure 4



- * Wyoming Game and Fish Dept. WOS locations (1985-Present)
- Forest Service Incidental Sightings (1990-Present)
- WG&F Black-footed Ferret Surveys, Swift Fox Sightings 1995
- Historic Range (Long 1965)

APPENDIX A

Descriptions of survey routes during swift fox distribution surveys in Wyoming, March-September 1995 (CR = county road SR = state route).

1. Laramie county, start at SR 85 and CR 128, go north to CR 226 east to CR 131 south to SR 85 southwest to CR 222 east to CR 142 stop about 1 mile from Hillsdale. (30 mi).
2. Laramie county, start 1 mi. south of I-80 on SR 214, go south to CR 207 west to CR 138 south to CR 203 west, stop about 0.5 miles from SR 85 (21 mi).
3. Laramie county, start about 7.5 miles west of I-25 on SR 211 go northwest stop at Iron Mtn. Rd. (29 mi).
4. Albany county, start 1 mi. southwest of Cement Plant on CR 34 go southwest towards Hutton Lake to CR 316 go east stop 0.5 miles from US 287 (30 mi).
5. Albany county, start at railroad tracks on SR 12 go northwest under I-80 to Herrick Ln and I-80, end of that portion. Start again on CR 57 at cattle guard about 7 mi. from SR 12, go east to intersection of SR 12 & CR 57 and go south to SR 130 go east about 0.25 mi. to CR 44 go south to SR 422 go west about 3 mi. and end about 3 mi. north of SR 230 (30 mi).
6. Albany county, start on CR 51 (Howell Rd.) and go northwest to Bosler, at Hwy 287 go south to SR 34 and then go northeast on SR 34 about 11.7 mi. to Morton Pass (30 mi).
7. Albany county, start on the CR 61 (Ft. Fetterman Rd.) about 8.4 mi. from Hwy 287, go north on CR 61 to CR 64, go north on 64 and end at intersection of CR 64 and CR 619 (30 mi).
8. Carbon county, start on CR 500 about 2.0 mi. east of intersection of SR 71/CR 401 and CR 500, go east on CR 500 about 21.8 mi. to Saratoga (22 mi).
9. Carbon county, start on SR 130 north of Saratoga at CR 206 (the Hatchery Rd.) and go north about 14 mi. to Rattlesnake Rd., go east on Rattlesnake Rd. to CR 215, then go south on CR 215 about 4 mi. to Pass Cr. Rd., then go west on Pass Cr. Rd. to SR 130 (26 mi).
10. Carbon county, start on SR 351 (Seminoe Hwy.) at fork with CR 324 and go northeast about 22.5 mi. (23 mi)(ran plates at 0.5 intervals, skipped narrows).
11. Carbon county, begin on CR 347 near Platte river and I-80, go south 1 mi and start transect in Severton Basin (6 mi)(ran plates at 0.5 intervals, skipped narrows).
12. Carbon and Sweetwater counties, begin at intersection of SR 789 and CR 701 go north 3 mi. and start transect, go north 25 mi. to Wamsutter (25 mi).
13. Carbon county, begin at intersection of SR 71 and CR 605, follow CR 605 west to RR tracks and turn south, go south about 1 mi. and start transect, go south on CR 605 17 mi (17 mi).

APPENDIX A (cont'd)

14. Carbon, Sweetwater, and Fremont counties, start at intersection of BLM rd. #2317 (Atlantic City cutoff) and Crooks Gap Rd. (Fremont Co.), go south on Crooks Gap Rd. 45 mi. (it turns into CR 23N, Sweetwater Co.) to I-80 (45 mi).
15. Sweetwater county, start at intersection of CR 23N and BLM Rd. #3212, go west on BLM #3212 about 8 mi. to BLM Rd. #3217, go south on BLM # 3217 and then east back to CR 23N (23 mi).
16. Sweetwater county, start at intersection of I-80 and Red Desert Rd., go north on Red Desert Rd. to CR 20, go north on CR 20 5.7 mi. to a small gas well service road near a flowing well (may be called Lost Lake Rd.) and small pond, go east on service road about 1.3 mi., turn around and return to CR 20, and go north on CR 20 to next gas well service road, go east about 1.5 mi., end there (25 mi).
17. Sweetwater county, start at intersection I-80 and BLM #3203 (Riner Rd.) and go northwest 29 mi. and end at CR 63 (29 mi).
18. Natrona county, start at intersection of CR 201 (poison Spider Rd.) and CR 210, go west on CR 201 west 31 mi. and end near Fales Rocks (30 mi).
19. Natrona county, start at intersection of SR 220 and CR 321 (Dry Creek Rd.) and go northwest 30 mi., end about 2.4 mi from CR 212 (30 mi).
20. Fremont county, start at intersection of US 287 and Agate Flat Rd. BLM #2404, go northeast on Agate Flat Rd. about 20 mi. to Beaver Divide Rd. (BLM Rd. no number) go east on Beaver Divide Rd about 2 mi., cross Middle Fork, Sage Hen Creek and go another 1-2 mi. (25 mi).
21. Natrona county, start at intersection of CR 201 (Poison Spider) and CR 211 (Powder River Rd.), go north on CR 211 and end near Powder River (20 mi).
22. Fremont county, start at intersection of US 20-26 and Castle Gardens Rd., go south on Castle Gardens Rd. 21 mi., end at Gas Hills Rd. (21 mi).
23. Fremont county, start at Lost Cabin and go east on Lost Cabin/Arminto Rd., turns into (Natrona) CR 103, end at CR 105 (21 mi).
24. Natrona county, start at Arminto at intersection of CR 105 and CR 108, go east on CR 108 about 12 mi. to CR 106, go south about 12 mi., end about 1 mi. from Powder River (26 mi).
25. Natrona county, start at intersection of CR 110 and US 20-26, go north on CR 110 to CR 125, continue north on CR 125 about 18 mi. and end near intersection of CR 110 and CR 112, (30 mi).
26. Natrona and Johnson counties, start at intersection of CR 110 and CR 112 (Natrona) and go north (turns into TTT Rd., Johnson Co.), end at I-25 near Kaycee, (22 mi).
27. Johnson county, start on Reno Rd., about 1 mi. east of I-25 on top of the hill, go east on Reno Rd. about 5-6 mi. to the Buffalo-Sussex Rd., go north on the Buffalo-Sussex Rd., end at the Irigaray Rd #142, (24 mi).

APPENDIX A (cont'd)

28. Johnson county, start at the Johnson/Sheridan county line on the Upper Powder River Rd. #195, go south on the Upper Powder River Rd. to the Tipperary Rd. #54, go southwest on the Upper Tipperary Rd. about 23 mi. and end near the TW Rd.
29. Johnson county, start at the intersection of the Buffalo-Sussex Rd. and go east on the Irigaray Rd. #172, go 22 mi. and stop about 1 mi. from the Powder River (23 mi).
30. Sheridan county, start at the intersection of CR 42 and SR 14-16 and go west on CR 42 about 21 mi. end near CR 86 (21 mi).
31. Sheridan county, start at the intersection of CR 255 and CR 70 and go north on CR 255 about 23 mi. to the Montana state line (23 mi).
32. Campbell county, start at the intersection of Echeta Rd. and Cook Rd., go about 3 miles and start near Bell Rd., and go about 29 mi. ending about 1.2 mi. from the Sheridan county line (25 mi).
33. Campbell county, start at the picnic area (about 1 mi. east of Hwy 59) on Rockypoint Rd. and go northeast about 21 mi. to Rockypoint (22 mi).
34. Campbell county, Durham Bison Ranch on Douglas Hwy, start at north end near Hwy turnout, follow road to northern boundary near the Belle Fourche river, go east to reservoir on Belle Fourche river and then go south and then go west to Douglas Hwy. Start at road that goes to Eagles Roost, runs by large House on hill, follow road to western boundary.
35. Campbell county, start at intersection of SR 450 and the Hilight Rd., go south on the Hilight Rd. to the Reno Rd., go east around the bend in the road and then south to Mackey Rd., go east on Mackey Rd. to Payne Rd. and then go north on Payne Rd. to Reno Rd., turn around and return to Mackey Rd., cross Mackey Rd. and continue straight on Payne Rd. about 1.5 mi. turn around at end and return to Mackey Rd., go east again on Mackey Rd. and end at Rochelle Hills Rd. (34 mi).
36. Converse county, start at the intersection of Ross Rd. and SR 93, go north on Ross Rd. about 23 mi. and stop at the Jenne Rd. (24 mi).
37. Converse county, start at the intersection of Steckly Rd. and SR 59 and go east on Steckly Rd. about 4 mi to Forest Service (FS) Rd. #942, go south on FS #942 about 2 mi. and turn around and return to Steckly Rd., go east on Steckly Rd. about 11 mi. to FS Rd. #742D, go south about 2 mi. to dead end at gas well and turn around, return to Steckly Rd., go north east on Steckly Rd. about 4 mi. to FS Rd. #742, go south on FS Rd. #742 about 2 mi. end at gate on top of hill (Woody Cr. Rd.)(24 mi).
38. Goshen county, start at end of pavement on SR 159, about 1 mi. south of RR tracks, go south 23 mi and end near power lines about 5 mi. north of Torrington (21 mi).
39. Goshen county, start about 2 mi. north of Fort Laramie on the Prairie Center Rd. (43D2) and go north to CR 15C2 and go northeast on 15C2 to CR 8B2, go east on 8B2 to Jay Em and then go south on SR 85 to the Prairie Center Rd. go east on the Prairie Center Rd. and end at SR 159 (35 mi).

APPENDIX A (cont'd)

40. Weston county, (3 transects by volunteers) 3 @ 20 mi.; Mush Cr. Rd., Old Hwy. 85, and Morrisey Rd.

41. Laramie county, F.E. Warren Air Force Base, (2 transects by volunteer) 2 @ 10 mi.; Missile Dr. to Central Ave., and along north fence and north part of east fence.

42. Campbell county, (1 transect by volunteer), Thunder Basin National Grassland, west of Rockypoint Rd.

APPENDIX B

Locations of swift fox observations and tracks during 1995 state-wide swift fox distribution surveys.

Obs	Surv	Act	Type	Dist	Date	Spp	# Seen	Location			Habitat Type	Activ Code	Den
								Zone	Northing	Easting			
9	G			5	30295	904	1	13	4576814	520944	7.11	8	0
1	G			5	30295	904	2	13	4567908	542433	7.11	3	1
9	G			5	30295	904	1	13	4569487	519306	7.11	8	0
9	G			5	30295	904	1	13	4574533	540712	7.11	8	0
9	G			5	30295	904	1	13	4558921	464690	7.11	8	0
9	G			5	30495	904	1	13	4573826	520899	7.11	8	0
9	G			5	30895	904	1	13	4579048	523493	7.11	8	0
9	G			5	31495	904	1	13	4549800	536874	7.11	8	0
9	G			5	31495	904	1	13	4545202	536897	7.11	15	0
9	G			5	31495	904	1	13	4545486	536740	7.11	15	0
9	G			5	31495	904	1	13	4571025	541649	7.11	8	0
9	G			5	31495	904	1	13	4544232	521769	7.11	8	0
9	G			5	31495	904	2	13	4543750	536686	7.11	3	1
9	G			5	31495	904	1	13	4550142	538175	7.11	8	0
9	G			5	31595	904	1	13	4545277	535003	7.11	8	0
1	G			5	31595	904	1	13	4545264	534560	7.11	3	1
9	G			5	31795	904	1	13	4545173	530461	7.11	8	0
9	G			5	32195	904	1	13	4597479	482628	7.11	8	0
9	G			5	32195	904	1	13	4569346	492468	7.11	3	1
9	G			5	32295	904	1	13	4597479	482628	7.11	8	0
9	G			5	33095	904	1	13	4549878	441806	7.12	8	0
9	G			5	33195	904	1	13	4554271	437938	7.12	8	0
9	G			5	40195	904	1	13	4555364	439111	7.12	8	0
9	G			5	50295	904	1	13	4588926	441410	7.12	15	0
9	G			5	50595	904	1	13	4603998	447310	7.12	8	0
9	G			5	50595	904	1	13	4609632	453521	7.12	8	0
9	G			5	52195	904	1	13	4612977	411939	7.12	15	1
9	G			5	60295	904	1	13	4633792	436015	7.12	15	0
9	G			5	60295	904	1	13	4633114	434236	7.12	15	0
1	O			7	62195	904	1	13	4845000	528000	7.12	15	0
9	G			6	70895	904	1	12	4649331	730472	4.10	5	0
9	G			6	71195	904	1	13	4650830	263506	4.21	8	0
9	G			7	72395	904	1	13	4751440	322877	4.10	5	0
9	G			7	72395	904	1	13	4747524	321857	4.10	5	0
9	G			6	72795	904	1	13	4777031	278747	4.10	15	0
1	G			5	81695	904	1	13	4609834	453736	7.12	a	0
9	G			7	83095	904	1	13	4761421	446361	7.12	8	0
9	G			5	90695	904	1	13	4682771	567970	7.12	15	0
9	G			5	90695	904	1	13	4667950	565553	7.12	15	0

Legend:

Obs Act: observer activity, 9 = general census, 1 = casual observation

Surv Type: survey type, G = Univ of Wyoming (Research), 0 = WGFD personnel

Dist: WGFD district number

Spp: WGFD species code

seen: number of swift foxes observed

Zone Northing Easting: UTM coordinates

Habitat Type: WGFD habitat code, 7.11 = shortgrass, 7.12 = midgrass,
4.10 = sagebrush-grassland, 4.21 = greasewood-sagebrush

Activ Code: animal activity code, 3 = loafing, 5 = feeding/hunting,
8 = sign (track), 15 = running

Den: 1 = den observed, 0 = no den observed

a roadkill, WGFD mortality code 3.01

APPENDIX C

Locations of other species observed during state-wide swift fox distribution surveys, 1995.

Obs Act	Surv Type	Dist	Date	Spp	# Seen	Location			Habitat Type	Activ Code	Den
						Zone	Northing	Easting			
Red Fox:											
9	G	5	40495	903	1	13	4588942	416307	7.12	8	0
9	G	5	40495	903	1	13	4587078	418830	7.12	8	0
9	G	5	40595	903	1	13	4585075	421286	7.12	8	0
9	G	5	40595	903	1	13	4586270	420291	7.12	8	0
9	G	5	40795	903	1	13	4584209	422493	7.12	8	0
9	G	6	52195	903	1	13	4619623	338355	4.10	8	0
9	G	7	71895	903	3	13	4744479	344915	4.10	14	1
9	G	7	71995	903	3	13	4744479	344915	4.10	13	1
9	G	7	72495	903	2	13	4775159	278906	4.10	14	0
9	G	7	72495	903	1	13	4774823	278900	4.10	8	0
9	G	6	72595	903	1	13	4788094	313316	4.10	3	0
9	G	6	72795	903	2	13	4775159	278906	4.10	13	0
9	G	7	72895	903	1	13	4773000	336000	4.10	8	0
9	G	7	80595	903	1	13	4778960	371045	4.10	14	0
9	G	7	80595	903	1	13	4765121	368827	4.10	8	0
9	G	7	80695	903	1	13	4819192	364528	4.10	8	0
9	G	3	80895	903	1	13	4868929	380888	4.10	14	0
9	G	3	80995	903	2	13	4873590	379596	4.10	14	0
9	G	3	81095	903	1	13	4869193	397460	4.10	14	0
9	G	3	82395	903	1	13	4859678	462472	7.12	14	0
9	G	3	82495	903	1	13	4825272	474770	7.12	14	0
9	G	3	82495	903	1	13	4851620	461406	7.12	14	0
9	G	3	82495	903	1	13	4864109	461647	7.12	14	0
9	G	3	82595	903	1	13	4823357	481052	7.12	8	0
9	G	3	83095	903	1	13	4808541	476739	4.10	8	0
9	G	7	83095	903	1	13	4768016	441432	4.10	8	0
9	G	3	83095	903	1	13	4808452	476673	4.10	14	0
9	G	7	83195	903	1	13	4804226	465640	4.10	14	0
9	G	7	83195	903	1	13	4781039	442267	4.10	14	0
9	G	7	83195	903	1	13	4785487	443254	4.10	14	0
Raccoon:											
9	G	5	50495	907	1	13	4587300	441510	7.12	14	0
9	G	7	71895	907	1	13	4739400	324600	4.10	14	0
9	G	7	71995	907	1	13	4739400	324600	4.10	13	0
9	G	3	80895	907	1	13	4859303	375096	10.1	3	0
9	G	3	81095	907	1	13	4872531	394453	10.1	14	0
Bobcat:											
9	G	7	72495	921	1	13	4758200	330500	4.10	14	0
9	G	3	82495	921	1	13	4852757	459941	7.12	14	0
Long-tailed Weasel:											
1	G	6	70595	911	1	13	4635500	750000	4.10	15	0
1	G	7	72395	911	1	13	4745900	321750	4.10	15	0
Ermine:											
1	G	6	72495	910	1	13	4751000	281000	4.10	8	0

APPENDIX C (cont'd)

Locations of other species observed during state-wide swift fox distribution surveys, 1995.

Obs Act	Surv Type	Dist	Date	Spp	# Seen	Location			Habitat Type	Activ Code	Den
						Zone	Northing	Easting			

Mtn. Plover:											
1	G	5	50195	281	2	13	4597948	439379	7.12	13	-
1	G	5	60295	281	1	13	4636111	437973	7.12	13	-
1	G	5	60295	281	1	13	4643838	435873	7.12	13	-
1	G	5	60295	281	1	13	4641402	437284	7.12	13	-
1	G	6	62195	281	1	13	4620515	338623	4.10	13	-
1	G	6	70595	281	1	13	4659700	254869	4.10	13	-
Burrowing Owl:											
1	G	3	82395	378	2	13	4861755	461052	7.12	03	0
1	G	5	90795	378	1	13	4699813	542901	4.10	15	0
Sage Grouse:											
1	G	6	70595	309	»15	13	4685500	259000	4.10	17	-
1	G	6	70695	309	2	12	4641000	737000	4.10	14	-
1	G	6	70795	309	1	12	4635000	735000	4.10	14	-
1	G	6	70895	309	3	12	4654000	254500	4.10	14	-
1	G	6	71095	309	1	13	4645627	266535	4.10	14	-
1	G	6	71195	309	5	13	4656000	269500	4.10	14	-
1	G	7	72195	309	9	13	4726668	308820	4.10	14	-
1	G	7	80595	309	4	13	4804191	355060	4.10	14	-
1	G	6	82195	309	3	13	4723437	287860	4.10	14	-
Spotted Skunk:											
1	G	6	70895	916.1	1	12	4649000	729500	4.21	8	-
Badger:											
1	G	5	42695	915	1	13	4590000	441000	7.12	15	0
1	G	5	51695	915	1	13	4633000	433000	4.10	15	0
1	G	5	51695	915	1	13	4643000	436500	4.10	15	0
1	G	5	51695	915	1	13	4644500	436400	4.10	15	0
1	G	6	70795	915	1	12	4618000	740000	4.10	13	1
1	G	6	70795	915	1	12	4649200	730450	4.21	15	1
1	G	3	82295	915	1	13	4969000	492000	7.10	8	0
1	G	3	82495	915	1	13	4861658	461206	7.12	15	0

APPENDIX D

SWIFT FOX TRACKING PLATE SURVEY PROTOCOL

1. The tracking plates should be somewhat clean and smooth. If not, use a "scotch brite" pad or some coarse steel wool to clean up areas where rust or old bait have adhered to the surface.
2. At the beginning of the transect, reset trip odometer at an identifiable landmark, e.g., beginning of road, sign, etc. At the first mile, stop and place the tracking plate near the right-of-way fence (if present) or within the easement. Easements may vary in distance from the road so if you are unsure, contact the county about the distance for the particular road you are going to use, or obtain landowner permission.
3. There are two ways to prepare tracking surface:
 - a) To prepare the alcohol/carbon tracking medium, put about 7-15 heaping teaspoons carbon into the 1 liter plastic bottle and fill about 3/4 full with alcohol and mix. Squirt the alcohol/carbon mixture on the plate and then lift and move the plate around so that the mixture covers the plate. Adjustments to the proportions of carbon/alcohol may be needed if the surface has too little or too much carbon.
 - b) An acetylene torch also can be used to blacken the plates, but all safety instructions that accompany the torch outfit should be followed, including wearing safety glasses and a respirator. Use only the acetylene to create a black, sooty smoke. Use the end of the flame to apply the black coating across the plate. Do not keep the flame in one spot too long because heating the metal will cause it to become permanently black, making footprints difficult to read.

After the surfaces are prepared place a "pinch" of mackerel in the center (we are trying to attract them, not feed them) and place some surveyors' ribbon on the fence to help find the plate the following day.

4. Transects can be placed out morning or evening and then checked once daily for two or three days. Plates should be left out longer if the weather has affected the tracking surface. During the summer months plates should be placed out in the evening hours and then checked the next morning because thundershowers will wash off the carbon coating.
5. Record all swift fox tracks (and those that might be) on the data sheet using clear packing tape. The tape can be folded over and rolled across the track and then taped onto a sheet of paper with the *date, location, Wildlife Observation System habitat code, and observer's name*. It is extremely important that the tracks are lifted and then stored carefully.
6. Likely swift fox habitat has been described as short-, mid-, and mixedgrass prairie types with flat to gently rolling topography. Swift fox have also been found to have dens in cultivated fields, near buildings, graveyards, and in sagebrush habitat types.

WYOMING GAME AND FISH COMMISSION

CHAPTER LII

NONGAME WILDLIFE

Section 1. Authority. This regulation is promulgated by authority of W.S. 23-1-103 and 23-1-302 (a)(i), (xix), (xxii).

Section 2. Regulation and Effective Date. The Wyoming Game and Fish Commission hereby adopts the following regulation governing taking of nongame wildlife listed in the sections of this regulation. This regulation shall remain in effect until modified or rescinded by the Commission.

Section 3. Definitions. For the purpose of this regulation, definitions will be as set forth in Title 23, Wyoming Statutes, and the Commission also adopts the following definition:

(a) "Nongame wildlife" shall be all mammals, birds, fish, amphibians, reptiles, mollusks, crustaceans, their viable gametes(eggs and sperm), fertilized eggs, or any hybrid or any transgenic product thereof which are listed in Sections 6, 7, 8, 9, 10, or 11 of this regulation, and includes species classified by W.S. 23-1-101 as protected birds or protected animals.

(b) "Commercial use" means utilizing nongame wildlife in sale, trade, barter, brokerage, or other commerce.

Section 4. Taking of Nongame Wildlife. No person shall take any nongame wildlife listed in this regulation except as provided in Sections 6, 7, 8, 9, 10 or 11. Any take of nongame wildlife listed in this regulation for commercial use shall be prohibited except as provided in Sections 6, 7, 8, 9, 10, or 11.

Section 5. Savings Clause. If any provisions of these regulations or their application to any person or circumstance are held invalid or in conflict with any other provision of these regulations, the invalidity shall not effect other provisions or their application of these regulations which can be given effect without the invalid provision or applications and to this end the provision of these regulations are severable.

Section 6. Nongame wildlife listed in this section as Mollusks or Crustaceans may be possessed without securing a permit in accordance with Commission Regulation Chapter X (Import, Possession, Sale of Live Wildlife) or taken for scientific purposes in accordance with Commission Regulation Chapter XXXIII (Scientific Collection Permits). Unless they are taken for personal consumption or used as fishing bait in the waters from which they were taken, all live Mollusks and Crustaceans must be confined in aquariums.

Sculpins

Mottled Sculpin
Paiute Sculpin

Cottus bairdi
Cottus beldingi

Sucker

Bluehead Sucker
Flannelmouth Sucker
Longnose Sucker
Mountain Sucker
Shorthead Redhorse
Quillback Sucker
River Carpsucker
Utah Sucker
White Sucker

Catostomus discobolus
Catostomus latipinnis
Catostomus catostomus
Catostomus platyrhynchus
Moxostoma macrolepidotum
Carpionodes cyprinus
Carpionodes carpio
Catostomus ardens
Catostomus commersoni

Section 10. Nongame wildlife listed in this section may be taken in accordance W.S. 23-2-105 (License to take falcons) and Commission Regulation Chapter XXV or XXV.1 (Falconry and propagation), federal regulation (50 CFR 21.28,29,30), Federal Migratory Bird Treaty Act and the Federal Endangered Species Act of 1973 as amended.

Birds

Falcon

American Kestrel
Gyr Falcon
Merlin
Prairie Falcon
Peregrine Falcon

Falco sparverius
Falco rusticolus
Falco columbarius
Falco mexicanus
Falco peregrinus

Hawks

Cooper's Hawk
Ferruginous Hawk
Northern Goshawk
Northern Harrier
Red-tailed Hawk
Rough-legged Hawk
Sharp-shinned Hawk
Swainson's Hawk

Accipiter cooperii
Buteo regalis
Accipiter gentilis
Circus cyaneus
Buteo jamaicensis
Buteo lagopus
Accipiter striatus
Buteo swainsoni

Eagle

Golden Eagle

Aquila chrysaetos

Section 11. There shall be no taking of birds, amphibians or reptiles listed in this section except as provided in Commission Regulation Chapter X (Import, Possession, Sale of Live Wildlife) or XXXIII (Scientific Collection Permit), federal regulation (50 CFR), Federal Migratory Bird Treaty Act and the Federal Endangered Species Act of 1973 as amended.

Taking of wildlife listed as mammals in this section is not allowed except as provided in Commission Regulation Chapter X (Import, Possession, Sale of Live Wildlife), or XXXIII (Scientific Collection Permit) or under one or more of the following conditions:

- it is determined to be unavoidable and does not result from conduct with lack of reasonable care.
- it results from control measures approved by the department as necessary to address public health concerns.

Pelts legally taken from mammals listed in this section may be sold.

Mammals

Bat

Big Brown Bat	<u>Eptesicus fuscus</u>
Brazilian Free-tailed Bat	<u>Tadarida brasiliensis</u>
California Myotis	<u>Myotis californicus</u>
Fringed Myotis	<u>Myotis thysanodes</u>
Hoary Bat	<u>Lasiurus cinereus</u>
Little Brown Myotis	<u>Myotis lucifugus</u>
Long-eared Myotis	<u>Myotis evotis</u>
Long-legged Myotis	<u>Myotis volans</u>
Northern Myotis	<u>Myotis septentrionalis</u>
Pallid Bat	<u>Antrozous pallidus</u>
Red Bat	<u>Lasiurus borealis</u>
Silver-haired Bat	<u>Lasionycteris noctivagans</u>
Spotted Bat	<u>Eudernia maculatum</u>
Townsend's Big-eared Bat	<u>Plecotus townsendii</u>
	<u>pallescens</u>
Western Small-footed Myotis	<u>Myotis ciliolabrum</u>
Yuma Myotis	<u>Myotis yumanensis</u>

Chipmunk

Cliff Chipmunk	<u>Tamias dorsalis</u>
Uinta Chipmunk	<u>Tamias umbrinus</u>
Yellow-pine Chipmunk	<u>Tamias amoenus</u>

Fox

Gray Fox	<u>Urocyon cinereoargenteus</u>
Swift Fox	<u>Vulpes velox</u>

Mole

Eastern Mole	<u>Scalopus aquaticus</u>
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Mouse

Canyon Mouse	<u>Peromyscus crinitus</u>
Great Basin Pocket Mouse	<u>Perognathus parvus</u>
Hispid Pocket Mouse	<u>Perognathus hispidus</u>
Meadow Jumping Mouse	<u>Zapus hudsonius</u>
Pinon Mouse	<u>Peromyscus truei</u>
Plains Harvest Mouse	<u>Reithrodontomys montanus</u>
Plains Pocket Mouse	<u>Perognathus flavescens</u>
Silky Pocket Mouse	<u>Perognathus flavus</u>
Western Jumping Mouse	<u>Zapus princeps</u>
White-footed Mouse	<u>Peromyscus leucopus</u>

Ringtail

Ringtail	<u>Bassariscus astutus</u>
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